BUtgb vzw - UBAtc asbl

CONSTRUCTION SYSTEMS

WOOD CONSTRUCTION SYSTEMS

GABLOK

Valid from 03/09/2024 to 02/09/2029

Approval holder:

Gablok NV
Rue Des Waides 18 C
4890 Thimister-Clermont
Tel.: +32470925042
Website: gablok.be
E-mail: secretariat@gablok.be

ATG 3325

A Technical Approval is based on a favourable evaluation of a construction product by a skilled, independent and impartial approval body designated by UBAtc for a specific application.

The Technical Approval serves as a record of the approval inspection. This inspection consists of the following:

- identification of relevant properties of the product for the intended application, laying/installation method, product design and reliability of production.
- product design,
- reliability of production.

The Technical Approval provides a high level of reliability, based on the statistical interpretation of inspection results, regular monitoring and adjustments, in order to keep abreast of the situation, the latest technical developments and quality monitoring by the Approval Holder.

In order to retain the Technical Approval, the approval holder must continuously provide evidence that he is taking all necessary steps to demonstrate that the system is suitable for use. In order to do so, it is vital that the conformity of the system with the Technical Approval is monitored. This monitoring is entrusted by the UBAtc to a skilled, independent and impartial Certification Body.

The Technical Approval and certification for conformity of the product to the technical approval are independent of tasks conducted individually. The contractor and/or architect remain fully responsible for the conformity of the completed work with the provisions contained in the specifications.

The Technical Approval is not concerned, except in specifically included provisions, with on-site safety, health aspects and the sustainable use of raw materials. As a result, the UBAtc shall not be responsible, under any circumstances, for any damage caused by the failure of the Approval Holder, contractor(s) and/or architect to respect provisions relating to on-site safety, health aspects and the sustainable use of raw materials.

In the contract between the seller and purchaser, it must be stipulated that the approval specifications apply and who is responsible for installation. This must be formalised by the attached "declaration of conformity". Any non-essential exemptions are permitted, provided they are listed in the “declaration of conformity" and approved by the client and/or architect.

Approval holders

Buildwise

Kleine Kloosterstraat 23 1932 Sint-Stevens-Woluwe
info@buildwise.be - www.buildwise.be

SECO Belgium

Head office: Cantersteen 47 1000 Brussels
Offices: Hermeslaan 9 1831 Diegem
mail@seco.be - www.groupseco.be

Certification body*

BCCA

Head office: Cantersteen 47 1000 Bruxelles
Offices: Hermeslaan 9 1831 Diegem
mail@bcca.be - www.bcca.be

* The Certification body designated by UBAtc asbl operates in compliance with a system that is set to be accredited by BELAC (www.belac.be).

FOREWORD

This document is the first version of the approval document.

The technical approvals are regularly updated. It is recommended that you always use the version published on the UBAtc website (www.butgb-ubatc.be).

The most recent version of the technical approval can be consulted by scanning the QR code on the cover page.

NORMATIVE AND OTHER REFERENCES

AGCR-RGAC	30-06-2022	UBAtc General Approval and Certification Regulations
STS 23-1	2015	Combined technical specifications: timber-frame construction
NBN EN 1995-1-1+A2	2014	Design of timber structures - Part 1-1: General - Common rules and rules for buildings
NBN EN 1995-1-1 ANB	2012	National Belgian Annex
NBN EN 1990/A1	2006	Eurocode - Basis of structural design
NBN B 03-003	2003	Deformation of structures - Deformation limit values - Buildings
NBN D 50-001	1991	Ventilation systems for housings
NBN S 01-400-1	2022	Acoustical criteria for dwellings
Buildwise-contact 2020-03	2020	Acoustic performance of lightweight partitions
Buildwise-contact 2013-1	2013	Special edition: timber construction
Buildwise-Infofiche 11	2004	Indoor climate classes
EAD 340308-00-0203		Timber Building Kits
EOTA TR 001		Determination of impact resistance of panels and panel assemblies
		ISIB Avis Technique 2017-A-041 – Rév. 1
		Royal Decree of 7 July 1994, which establishes the basic standards for fire and explosion prevention required for buildings.
		Transfer of reference document: annexe 4 of the MB (Belgian Official Journal) of 28 December 2018

1 Objective and scope of the technical approval

A Technical Approval is based on a favourable evaluation of a construction system, with reference to STS 23 “Timber-frame construction”, 1978 and 1983 editions, by an independent approval body designated by UBAtc asbl. The outcomes of this evaluation are described in this approval document. This text identifies the product used in the system and determines the expected performance, in order to enable the production, use and maintenance of system, produced as specified in this approval document.

Technical approval is accompanied by regular inspections and adjustments in line with technical advancements, if such modifications are appropriate. The technical approval must be reviewed every three years.

For the technical approval to be renewed, the manufacturer must provide evidence, whenever required, that he is continuing to take necessary steps, in order to ensure that the assessment described in the approval document still applies. This monitoring is essential and ensures that the product complies with this technical approval. This task is assigned to a certification body designated by the UBAtc, BCCA.

On-going checks and statistical interpretation of results enable the associated certification to achieve a high level of reliability.

The approval and certification for conformity to the approval are independent of tasks conducted individually. The contractor and/or consultant remain fully responsible for the conformity of the completed work with the provisions contained in the specifications.

The contract between the purchaser and seller must mention explicitly that the approval conditions have been met, as well as the name of the person responsible for installation. This must be confirmed using the attached “Declaration of Conformity”. Any non-essential exemptions are permitted, provided they are listed in the “Declaration of Conformity” and approved by the client and/or his architect.

2 Object

2.1 Scope of the ATG and system components

The Gablok construction system is intended for the construction of single-family houses: detached, semi-detached, or terraced housing, with a maximum of two full surface levels, which are covered by a flat or sloping roof.

The construction system is intended for buildings with an indoor climate class 1 or 2.

It consists of the following components:

- The supporting structure consisting of external and internal walls, including all structural components, airtightness measures, waterproofing barriers, thermal insulation and assembly components, except for internal and external finishes.
- Floors and flat roofs, including all structural components, except finishes.
- An execution plan listing the instructions to be followed for correct on-site installation, including the necessary details, as well as a description of temporary measures used to protect the construction until its final completion.

The construction system components are also described in § 4. The approval holder retains control of these components. The approval holder either manufactures the components or approves externally manufactured components using the relevant documents and its in-house production control system.

The maximum standard height of the wall system is 9 rows of Gablok components or 2.7 m, not counting the cellular concrete and floor/roof composition. The standard upper floor height is approx. 3.20 m. The useful height depends on the thickness of the floor finishes.

2.2 Outside the scope of the ATG:

The following components do not fall within the scope of this approval:

- The architectural design of the house linked to the project.
- Structural assessment of the house linked to the project. The stability study can be conducted according to the provisions of this ATG, together with the relevant Eurocodes.
- The structural assessment linked to the project in the case of a seismic event, if necessary.
- The foundation plans and their implementation, including any underground levels.
- Assessment of measures required in relation to the project, in order to meet the applicable fire regulations, other than those described in § 7.2.
- Assessment of measures required in relation to the project, in order to meet the applicable standards for sound proofing, other than those described in § 7.5.
- Technical installations (electricity, heating, sanitary installations, ventilation, security, etc.)
- Design, manufacture and fitting of joinery.
- Design, manufacture and fitting of the sloping roof structure.
- Finishes, including insulation, flat and sloping roofs.
- External finishes
- Interior finishes (wall panels, screeds, floor finishes, internal joinery, kitchen, etc.)
- Completion and supervision of work.
- Transport
- Any materials that are not mentioned

The above-mentioned components must be designed and installed according to the current standards. The potential impact of these components on the construction system is assessed by the ATG holder. For example, this applies to the stability study and planning of necessary details. Limits can be imposed on these components by the approval holder, for example, with regard to potential exterior finishes.

This approval does not include any statements regarding earthquake resistance. These situations must be assessed on an individual case basis, based on Eurocode 8: NBN EN 1998-1+A1, including the national Belgian annexes: NBN EN 1998-1 ANB.

3 Materials

Trade names have been provided solely for information purposes. If a different brand and/or type is used, it is up to the manufacturer to demonstrate their equivalence as part of the continuous assessment and monitoring of the certification.

Table 1 – Materials

	Mark and/or type	Use	Reference	Comments
		Wall composition		
OSB-3	Egger OSB-3 E0 – 18 mm Formaldehyde E1; <0.03 ppm	Gablok structural components	EN 300	μ (dry/wet) = 200/150
OSB-3	Egger OSB-3 E0 – 15 mm, 18 mm Formaldehyde E1; <0.03 ppm	Structural wall cladding	EN 300	μ (dry/wet) = 200/150
EPS insulation blocks	X-pack	Gablok component filling: external wall insulation	EN 13163	Lambda value: 0,040 W/(mK)
EPS insulation boards		Insulation for floor/roof joint	EN 13163	
Rock wool		Insulation for party wall between housing units	EN 13162	Minimum density 35 kg/m³
Screws	Rothoblaas HTS Ø5/50	Gablok component composition Fastener used to attach first/last row to the base runners/top runner Fastener used to attach external battens	EN 14592	
LVL-C	Kerto-Q	Base runner	EN 14374	LVL with crossed layers
GL – GL24h	-	Top runner, supporting beams, lintels, columns	EN 14080	
Solid wood – C18	-	Internal battens	EN 14081	
Solid wood – C24	KVH C24	Studs, base runners, top runners and internal wall/partition wall blocks	EN 14081	
Solid wood – not classified according to strength		External battens	-	Wood preservative treatment A2 (Wolsit EC 40)
Cellular concrete	Ytong, quality class for compressive strength ≥ C2[1]	Wall base for external and internal walls	EN 771-4	Height 200 mm
EPDM sheet	-	Wall base protection between the cellular concrete and system walls	EN 13956	
Vapour barrier	Holztechnic Vaporin 120	Vapour barrier for walls	EN 13984	Minimal s_d value: 18m
Single-sided adhesive tape for vapour barrier	Holztechnic Sprinta	Fastener used to secure the vapour barrier	-	-
Single-sided adhesive tape for vapour barrier	Holztechnic Signo	Fastener used to fasten the vapour barrier to foundations	-	-
Rain barrier	Holztechnic Traspir 110	Rain barrier for external walls	EN 13859-1	Maximal s_d value: 0.035m

[1] Compressive strength of cellular concrete used during mechanical tests.

	Mark and/or type	Use	Reference	Comments
Rain barrier with UV resistance	Holztechnic Traspir EVO UV 115	Rain barrier for external walls with open façade cladding	EN 13859-1	Maximal s_d value: 0.035m
Single-sided adhesive tape for rain barrier	Holztechnic Simpla	Fastener used to secure the rain barrier using single-sided adhesive tape in order to guarantee continuity	-	-
Single-sided adhesive tape for UV resistant rain barrier	Holztechnic Frontband UV 120	Fastener used to secure the rain barrier using single-sided adhesive tape in order to guarantee continuity if open façade cladding is present	-	-
Plaster boards	Gyproc Rf, Gyproc WR or DuraGyp Comfort	Installation of panels on the internal side of partition walls		Total area density higher than 16 kg/m²
		Floors and flat roofs		
Solid wood – C24	-	Floor joists, roof beams, edge beams	EN 14081, EN 15497	Any scarf joints
OSB-3	Egger OSB-3 E0 – 18 mm Formaldehyde E1; <0.03 ppm	Structural cladding for floors and flat roofs	EN 300	
		Anchoring materials[2]		
Screwless anchor for concrete	Rothoblaas SKR 12x320; washer ULS 440	Anchor used to attach base runner to foundations	ETA-19/0100	-
Screwless anchor for concrete	Rothoblaas SKR 12x140	Tie-down anchor for foundations	ETA-19/0100	Standard
Anchor device for concrete	Rothoblaas AB1 16/145	Tie-down anchor for foundations	ETA-17/0481	If required, depending on the stability calculation
Chemical anchor	Rothoblaas INA 20/245 + VIN-FIX PRO	Tie-down anchor for foundations	DIN 975 ETA-20/0363	If required, depending on the stability calculation
Tie-down	Rothoblaas tie-down WZU4004	Anchor used to fasten internal batten to foundations	ETA-11/0086	Standard
Tie-down	Rothoblaas WHT 540 + washer Rothoblaas WHT 620 + washer	Integrated column anchor in the wall (bracing resistance)	ETA-11/0086	If required, depending on the stability calculation
Screws	Holztechnic SNK, Rothoblaas HBS	Fastener used to attach internal battens to the GABLOK components, Fastener used to attach floor components to the top runner, etc.	ETA-11/0030	-
Wood dowel	Ø20x95	Beam support on integrated columns	-	Beech dowel
Tape	Rothoblaas LBB1.5/40, LBB1.5/60, LBB1.5/80	Criss-cross application in order to reinforce external walls	EN 14545	If required, depending on the stability calculation
		Other		
Wood glue	Jowapur 681.xx	Joint adhesive OSB-3 (floor, reinforcements, etc.) Adhesive for beech dowels	EN 15425	Type I mono-component structural PU adhesive EN 15425 – I – 70 – GP – 0,3 – w

2: Main anchoring materials, which influence the construction system properties, additional anchoring materials could be used.

4 Components

4.1 External walls

External walls are built using the Gablok system and consist of the following components:

4.1.1 Base: lower rail

The base for external walls is created using a 45 mm x 264 mm LVL-C base runner.

4.1.2 Gablok components

All Gablok components are made from 18 mm thick OSB-3 panels. The panels are cut to measure and the components are assembled using screws (Ø5x50), which are inserted into pre-drilled holes.

The components are 300 mm wide, 300 mm high and 300 mm, 600 mm or 900 mm long.

All the components are made from a front and back panel, which are assembled using transversal components: a starting panel, a finish panel and a double intermediate panel every 30 cm.

The front and back panel include a groove measuring approx. 1 mm in depth, into which the transversal panels are inserted. The transversal panels are fitted to the front and back panel using Ø5 mm x 50 mm screws (3 per joint). Additional adhesive can be placed in the joint. This adhesive is not covered by the mechanical assessment of the system.

The resulting hollow spaces are filled with EPS insulation blocks.

The top section of the Gablok components can be chamfered in order to attach them to a sloping roof.

Vertical columns can be integrated locally in order to reinforce the walls and support heavy vertical or horizontal loads, for example, along recesses and under supporting beams (see § 4.1.9). In order to do this, the insulation is reduced locally and the blocks are given the suffix "-R.

Fig. 1 – Assembly principle

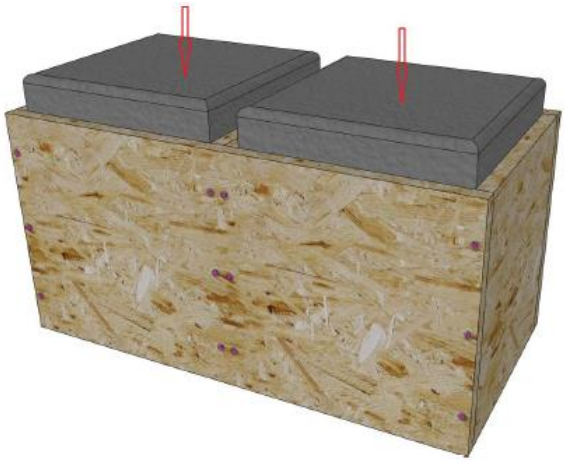


Fig. 2 – How to fit insulation

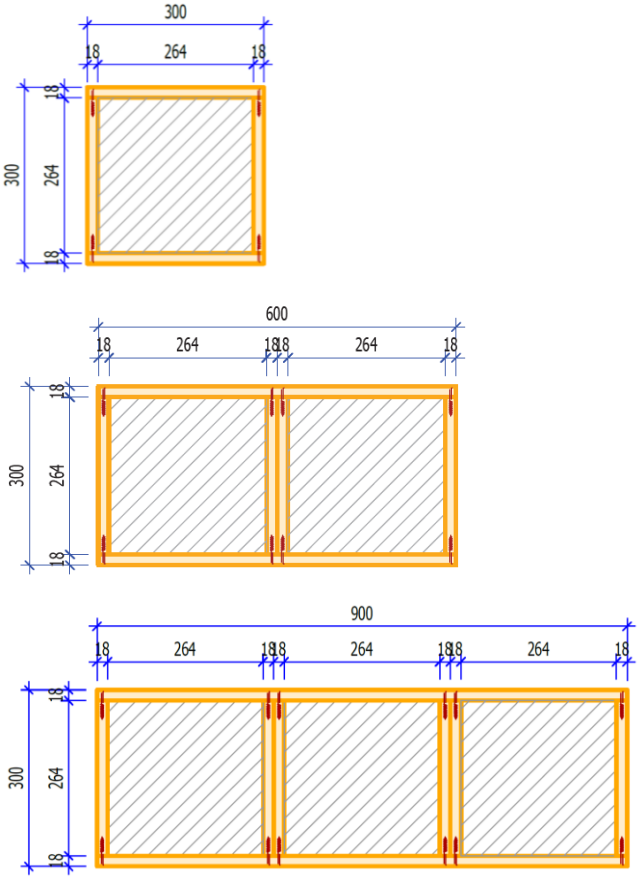


Fig. 3 – Component dimensions

4.1.2.1 Types

The first row of SF type Gablok blocks is placed on the base runner using a sliding movement. In order to make this possible, the transversal partitions have a 45 mm recess on their lower side. The insulation blocks in the first row are 300 mm high. They rest on the bottom rails and therefore protrude the OSB block by 45 mm.

Fig. 4 –SF type

The intermediate C type rows are offset on the underlying rows, so that the vertical joints between blocks are staggered by at least 300 mm. For this purpose, the OSB panels rest directly on the OSB panels in the underlying row. The insulation blocks are 300 mm high. They rest on the underlying insulation and therefore protrude the OSB block by 45 mm.

Fig. 5 – C type

The top SP type row is laid in exactly the same way as the C type components. The transversal partitions have a 45 mm recess on their upper side. The insulation blocks are 210 mm high. The upper face of the insulation is applied so that it matches the upper face of the transversal partitions, thus creating a space, into which the 45 mm x 264 mm GL top runner can be inserted.

Fig. 6 –SP type

The last SFP type component has a 45 mm recess on its lower and upper faces. It is applied if it becomes necessary to place a row of blocks between the higher lintel or floor/roof structure. It is fitted on a 45 mm x 264 mm GL base runner, which is fitted to the lintel. The insulation is 210 mm high.

Fig. 7 –SFP type

4.1.3 Insulation blocks

The insulation blocks are made from EPS graphite beads, which are expanded in a mould. As standard, the blocks are 262.5 mm wide, 262.5 mm thick and their height depends on their position within the system. Some EPS blocks are smaller in order to create space for integrated columns. The EPS insulation is slightly rounded on the top section, with a radius of 10 mm, which is intended to simplify the installation of upper components. On the lateral faces, the EPS blocks include narrow but thick strips in order to guarantee that components can be secured firmly.

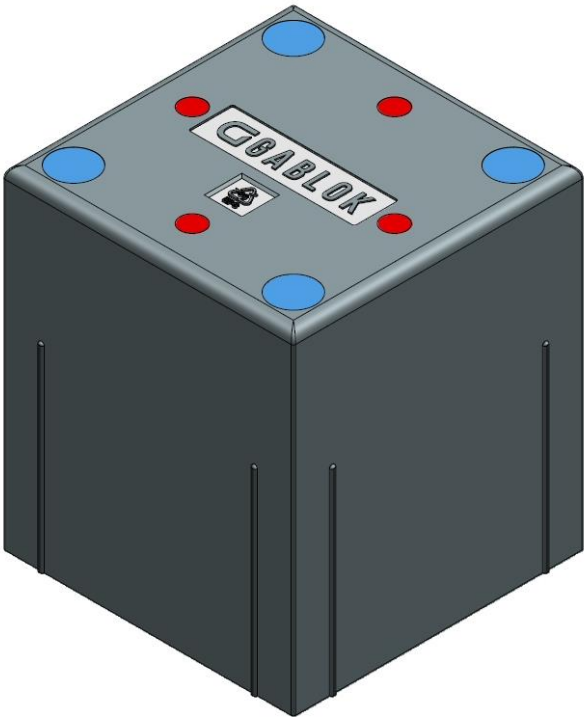


Fig. 8 – Standard insulation block

4.1.4 Lintels

The lintels fitted above the recesses are made from glued laminated timber with resistance class GL24h. They have a standard height of 300 mm and are 240 mm thick. If required, the lintels can be twice this height (600 mm).

4.1.5 Supporting beams

The beams are made from resistance class GL24h glued laminated timber. When fitted to the support, they have a standard height of 300 mm. Between the supports, the beam height can be increased depending on the stability calculation.

4.1.6 Battens

The entire Gablok wall is consolidated using vertical battens, which are applied to the internal and external faces.

Internal battens:

- 48 mm X 60 mm
- Resistance class C18
- Screws: Ø6 mm x 80 mm
- Factory pre-drilled

External battens:

- 24 mm X 48 mm
- Unclassified timber
- A2 treatment
- Screws: Ø5 mm x 50 mm
- Not factory pre-drilled

4.1.7 Sheetings

A 200 mm x 200 mm grid is printed on the sheetings, which facilitates correct installation of internal and external battens on the underlying structure.

4.1.7.1 Vapour barrier

On its internal face, the wall is covered with a vapour barrier with a s_d value of at least 18 m, which is applied before the internal battens are fitted.

4.1.7.2 Rain barrier

The wall is covered on its external face by a rain barrier with a maximum sd value of 0.035 m, which is applied before the external battens are fitted.

4.1.8 Anchors and assembly components

The system includes a wide range of fastener components, such as screws, tie-downs, tapes, etc., which are designed for connecting system components to adjacent sections. They are described in 0 and the relevant paragraphs of this document.

4.1.9 Reinforcements

Columns are integrated into the walls, along all the recesses and wherever this is required for stability purposes. These columns are made from glued laminated timber with resistance class GL24h. They have the following dimensions: 90 mm x 264 mm or 180 mm x 264 mm.

4.2 Internal walls

The internal walls are constructed as standard timber frame walls, with the following composition:

- Studs and rails:
- Solid finger jointed timber 45 mm x 145 mm
- Centre distance: 600 mm
- Resistance class C24
- Panels:
- OSB-3, 15 mm, applied to one or both faces, depending on the stability study.
- Assembly components:
- Ø5 mm x 50 mm screw
- Ø6 mm x 100 mm screw

4.3 Party walls between housing units

The party wall between two Gablok houses consists of two independent load bearing timber frame walls, which are separated from one another by a 40 mm cavity. A single wall can be fitted if a construction is built onto an existing house, or a façade adjacent to a building plot awaiting an adjacent construction.

Individual walls consist of a base runner, a top runner, studs, timber blocking, 60 mm x 140 mm, with resistance class C24. The studs have a maximum centre distance of 600 mm. The base runner and top runner are anchored to the underlying structure at least every 500 mm.

In order to guarantee fire resistance REI 60, each individual wall is covered on its internal face with a Gyproc Rf, Gyproc WR or DuraGyp Comfort type plasterboard. In addition, the wall is filled with rockwool with a minimum density of 35 kg/m³. The composition and finish meet the specifications of the plasterboard manufacturer, as well as the test report requirements.

On the cavity side, the wall is covered with a PE sheet, which is applied as a temporary protection against inclement weather during the construction phase.

4.4 Floors

The floors are of the same composition as conventional floors with timber frames, consisting of a layer with beams covered with OSB panels. Floors are an important structural component.

In the standard version, floor joists are 60 mm wide and 240 mm or 300 mm high. The standard centre distance of the floor joists is 40 cm. At the ends, the floor joists have dovetail milling so that they can be fitted to the milling on the edge beams.

4.5 Roofs

4.5.1 Flat roofs

The flat roofs are structured in the same way as the floors. Additional finishes, such as a vapour barrier, insulation and waterproofing are added to this structure.

The fitting of insulation and other finishes to the flat roof do not form part of the system.

5 Factory manufacture

5.1 Gablok components

All Gablok components are produced in the factories of the approval holder Gablok NV. The required materials (OSB-3 panels, screws, EPS insulation blocks, etc.) are supplied made to measure by external manufacturers, which are inspected by the approval holder.

As far as possible, Gablok components are fitted with the appropriate EPS blocks in the factory.

5.2 Other components

All timber is cut to the right length in the factory, where pre-drilled holes and countersunk recesses are made on low rails, so that screwless mechanical anchors can be fastened to the foundations.

Pre-drilled holes are also made in the beams, as well as reinforcement components for the dowels.

5 mm recesses are made in the factory in low/high rails for internal walls in order to fit studs.

The floor and roof beams include a dovetailed assembly component at the ends. The edge beams for the floor and roof construction include recesses so they can be inserted.

Pre-drilled holes are added to the internal battens in the factory so they can be fixed to the walls.

The tongue and groove OSB panels for floors and walls are packaged in the factory.

All the components are stacked on pallets in the factory and packaged in PE film.

6 On-site construction

The house is constructed using an execution plan prepared for each specific project. This plan includes a list of all the necessary components, the order in which they should be fitted, the necessary machinery, and appropriate details for implementation. The execution plan is prepared by the approval holder, Gablok NV.

On-site assembly is conducted by the project owner, or a contractor to whom he entrusts the relevant work.

The work must be supervised by the architect responsible for the project.

As some components, such as internal reinforcement components, are not visible after installation, it is advisable to document installation by means of photos, so that the correct execution of work can be supervised and monitored.

6.1 Substrate

The construction system can be assembled on all types of conventional foundations, including foundations built on footings, slabs, piles, basements, etc. Foundation design and execution depends on the project context and is not part of this technical approval. All foundations must be designed and completed according to the current standards. The resulting support must be continuous, level and load-bearing.

The foundations must be dimensioned according to the anticipated loads and bearing capacity of the support.

6.2 Structure

6.2.1 Delivery of materials and protection before, during and after work

6.2.1.1 Transport and delivery

The Gablok components are delivered to the site on pallets, which are protected with PE film.

Wood components and panels are delivered to the site, placed on blocks and protected using PE film.

6.2.1.2 Before execution

Unopened packages are adequately protected by their packaging, which is applied in the factory, provided it has not suffered damage. Additional protection must be provided for opened packages by adding the necessary coverings.

6.2.2 During execution

The main structure must be protected against inclement weather until the windproof and waterproof finishes have been added to the building.

Protective measures are described in the execution plan.

During assembly, horizontal surfaces, such as the upper wall surface, floors and roofs are to be covered with waterproof membranes, which must be fitted with sufficient overhang.

As soon as the external walls have been built and within 3 weeks of commencing installation, the contractor is responsible for protecting the entire external surface of the building using the rain barrier Traspir 110.

The party walls between two housing units, are covered on the cavity side with a PE film, in order to protect the walls against moisture during the construction phase.

6.2.3 After execution

The joinery must be fitted, together with any other windproofing or waterproofing, as soon as possible. During the intervening period, any unprotected recesses and surfaces must be fully protected using waterproof sheetings, temporary panels and waterproof adhesive tapes.

Wood components, like Gablok components, must not show any sign of excessive moisture, such as swelling, when the final finishes are added to the building.

6.2.4 Ground floor wall assembly

6.2.4.1 Base bed and installation base runner

The base bed consists of a 250 mm wide and 200 mm high layer of cellular concrete, which is placed on the foundations. This layer is executed according to the specifications of the material manufacturer. An EPDM sheet is applied to this layer as a moisture barrier and folded towards the bottom of the base bed layer. The minimum distance to exterior ground level is 20 cm. A cavity drainage sheet is applied to this moisture barrier, to which later the rain barrier is attached. The design and implementation of the waterproofing system are in line with the appropriate details provided by the architect or ATG holder.

A 45 mm x 264 mm LVL-C base runner is placed on top and centered in relation to the base bed layer, which is fastened to the foundations through the base bed layer using Rothoblaas SKR type 12x320 screwless anchors fitted with a ULS 440 washer, which are placed at least every 60 cm. In the corners, a distance of 18 mm must be maintained between the lower rails, so that the first row of blocks can be laid.

The anchors are sunk into the base runner in order to ensure the upper face remains level. The holes and recesses in the base runner are prepared in the factory. The cellular concrete and concrete foundations are drilled on-site.

If the underlying structure consists of beams and wooden joists, the above-mentioned principles must still be applied. However, the SKR anchors are replaced by appropriate anchors, in order to bear the same load. These anchors are calculated on a case-by-case basis by the consultancy.

6.2.4.2 First row of Gablok components

The first row of SF(-R) type Gablok components is placed over the base runner. A laying plan shows the exact location of the different components: SF300(-R), SF600(-R), SF900(-R). In order to do this, the insulation is pressed down on the top until it meets the lower face of the transversal partitions and protrudes on top by 45 mm.

A 40 cm wide intermediate film/vapour barrier is applied to the joint between the internal and external walls, in order to ensure that the vapour barrier is continuous.

The first row is fastened to the base runner using Ø5 mm x 50 mm screws, which go through the OSB and are applied every 15 cm on both sides of the wall.

The dimensions and squareness of the first row are checked by measuring the diagonals, using the oblique dimensions shown on the laying plan or the 3-4-5 method (by tracing a right-angle triangle with the following metric relations: 3-4-5).

6.2.4.3 Second row and reinforcements

The second row of C(-R) type Gablok components is pushed over the insulation in the first row so that the blocks are staggered. Once again, the insulation in the second row protrudes by 45 mm. The vertical joints are always offset by 300 mm. The OSB in the second row rests directly on the OSB on the underlying row.

Vertical reinforcements made from GL, measuring 90 mm x 264 mm or 180 mm x 264 mm, are added to the construction according to the laying plan, using the recesses provided for this purpose in the insulation.

6.2.4.4 Intermediate rows, beams and lintels

All the following C(-R) type rows are laid according to the same principles as the second row. The intermediate sheets for the vapour barrier are also folded upwards.

Lintels and beams are laid on the walls wherever necessary. The components are dimensioned according to the length and loads. The lintels and beams are supported by vertical reinforcements (columns). The position of the beams and lintels is indicated on the laying plan.

6.2.4.5 Top row

6.2.4.5.1 Load bearing wall

Wherever floor joists or roofs are supported by walls, a top row of SP(-R) type components must be added. This row is placed with the recess in the traversal panels and the insulation facing upwards.

The 45 mm x 264 mm GL top runner is inserted into the recess included on the upper side of the components.

The top row of components is fastened to the top runner using Ø5 mm x 50 mm screws, which are added every 15 cm on both sides of the wall.

6.2.4.5.2 Non-load bearing wall

Walls, on which no floor joist or roof will be laid that supports the top side, will be finished with an additional row of SP(-R) type components.

The 45 mm x 264 mm GL top runner is inserted into the recess on the upper side of the components.

The top row of components is fastened to the top runner using Ø5 mm x 50 mm screws, which are added every 15 cm on both sides of the wall.

The same components are also applied as a top row on the window recesses. It may be necessary to cut openings into the insulation used to cover the upper side of a C type component, in order to integrate the top runner.

6.2.5 Timber frame internal walls

The internal walls are constructed as standard timber frame walls. The components used are prefabricated to measure in the factory and assembled on site.

The prefabricated components are a base runner, a top runner and 45 mm x 145 mm C24 studs. The studs are inserted at least every 60 cm into 5 mm recesses provided in the base runner/top runner and secured using Ø6 mm x 100 mm screws. Vertical reinforcements are added where required, according to the stability study.

A layer of cellular concrete is applied to the foundations according to the specifications of the block manufacturer. A 0.7 mm EPDM sheet is placed on top.

A 45 mm x 145 mm wooden C24 adjustment rail is fastened to the foundations through the cellular concrete using SKR 12/320 screwless anchors (minimum 2 per wall section and each side of the door recess. Other quantities are possible depending on the engineer's report).

The prefabricated walls are fastened to the adjustment rail using Ø6 mm x 80 mm screws, with a minimum of 2 screws every 60 cm. The number of screws can be increased according to the specifications of the stability study.

The internal walls are covered on one or both sides with 15 mm thick OSB-3 panels, according to the specifications of the stability study, which are secured using Ø4 mm x 50 mm HTS screws applied at least every 150 mm along the panel edges, and every 300 mm on the intermediate studs, or according to a lower centre distance required by the specifications of the stability study. The OSB panels are applied horizontally and the tongue and groove joints are glued with a structural adhesive.

In order to ensure the bracing function of the internal walls, tie-down anchors are placed next to all wall openings, as well as at the start and end of the walls. The type of anchor, the anchor used in the foundations and the fasteners used on the studs follows from the stability study.

6.2.6 Party walls between housing units

The party wall between two Gablok houses consists of two independent, load-bearing walls with timber frames, which are separated by a 40 mm cavity filled with mineral wool.

If the Gablok house is built against an existing house, or is build adjacent to a building plot awaiting an adjacent construction, only a single wall will be built.

The actual walls consist of a C24 solid wall base runner, a top runner, studs and blocks. The section of the components is 60 mm x 140 mm. The maximum distance between the studs is 600 mm.

In order to guarantee fire resistance class REI 60, construction and finishing are completed according to the instructions of the manufacturer and specifications of the test report.

6.2.7 Floor and flat roof composition

6.2.7.1 Wall plate and edge beam

A 60 mm x 300 mm C24 solid wood edge beam is placed above the load-bearing walls.

The edge beam is fastened to the top runner on the wall using L-shaped irons, according to the details.

A intermediate sheet is placed under the edge beam in order to ensure that the vapour barrier is continuous. This sheet is extended towards the top of the external side of the edge beam.

The edge beam includes milled dovetailed recesses, into which the floor joists can be inserted.

A 60 mm thick EPS insulation panel is placed on the external face of the edge beam and temporary film.

On the supporting beams, an independent edge beam is fastened to the supporting beam using screws, which are inserted between the dovetailed recesses. A minimum of three Ø8 mm x 120 mm screws are used between two floor joists.

On the internal load-bearing walls, a double edge beam is applied, with the two components placed back to back and the dovetailed recesses facing outwards in alignment with the wall edge.

6.2.7.2 Floor joists or roof beams

The floor joists and roof beams are made from solid finger jointed timber, with a C24 strength class, supplied in the correct length and including dovetail profiling at both ends. The beams are inserted into the recesses in the edge beams. The beams are secured using two Ø6 mm x 120 mm screws.

6.2.7.3 OSB-3 floor covering

The OSB floor covering is applied to the floor and roof beams, so that it is level with the external side of the walls. The panelling is fastened to the edge beams and floor joists using Ø5 mm x 50 mm screws, which are applied every 15 cm along the panel edges and every 30 cm in the middle of the panels or according to the lower centre distances, based on the specifications of the stability study. The OSB panel joints are glued using a structural adhesive.

6.2.7.4 Roof finish

The flat roof finish does not form part of this approval.

The flat roof composition is based on the principles of a “warm roof”. The flat roof slope can be created using an insulation material with an integrated slope or sloping battens and any standard type of insulation material or roof waterproofing.

A continuous vapour barrier is applied under the insulation material. This vapour barrier must be connected to the vapour barrier on the walls.

6.2.8 Upper floor wall composition

6.2.8.1 Laying the base runner and first row

The intermediate sheet for the vapour barrier extends onto the OSB floor covering.

The 45 mm x 264 mm LVL-C base runner is placed on this temporary film. The base runner is placed 18 mm from the external edge of the OSB floor covering component, in order to ensure that it is in line with the top runner on the underlying wall In the corners, a distance of 18 mm must be maintained between the lower rails, so that the first row of blocks can be laid.

The first row of Gablok components for the upper floor is placed, while the dimensioning and squareness of the entire structure are checked using the diagonals and measurements indicated on the plan.

The base runner is secured through the underlying floor covering using Ø4 mm x 80 mm screws up to the underlying structural components (edge beam and floor joists, top runner of the underlying wall or beams/lintels). All odd insulation blocks must then be removed, before inserting at least 2 screws into the free space and replacing the insulation. The number of screws can be increased according to the specifications of the stability study.

6.2.8.2 Further assembly of upper floor walls

The further assembly of upper floor walls, including the use of blocks, lintels, beams and top runners, is completed in the same way as for the ground floor walls.

6.2.8.3 Sloping walls on the upper section

The walls are connected to a sloping roof, which means they include a slope on the upper side and are built using blocks specifically designed for this purpose, with an slope added to the upper section in the factory

6.2.9 Sheets

It is vital that the vapour barrier and rain barrier are placed correctly and continuously in order to guarantee a good performance of the construction system. They must be placed with the greatest care, according to the details listed in the execution plan.

6.2.9.1 Vapour barrier

The vapour barrier is applied to the internal face of all internal walls. It is temporarily held in place by staples before being permanently secured using the internal battens.

The vapour barrier is fastened to all the intermediate sheets at the connection to the internal walls, floors and roofs, using the single-sided adhesive tape provided for this purpose.

The vapour barrier is applied in the returns of all window recesses and fastened to the vapour barrier on the internal face of the walls.

On the lower section, the vapour barrier is attached to the foundations using the single-sided adhesive tape provided for this purpose.

6.2.9.2 Rain barrier

The rain barrier is applied to all the external surfaces. It is held in place by staples before being permanently secured using external battens.

The rain barrier overhangs the bottom, top and around the recesses by a few centimetres so that it can be joined to the moisture barriers and adjacent construction components (windows, plinths, roof edges, etc.).

6.2.10 Internal and external battens

6.2.10.1 Internal battens

48 mm x 60 mm internal battens made from C18 sawn timber are placed vertically every 40 cm against the internal face of the external walls.

The internal battens are pre-drilled in the factory and fastened to the Gablok components on site using Ø6 mm x 80 mm screws (Ø8 mm x 140 mm for the screw used on the base runner, for battens used with a tie-down). In order to do this, 2 screws are used per block, in the middle of the base runner, the top runner, and 40 mm from each joint between the rows. The grid printed on the vapour barrier simplifies the alignment of battens and screws with the underlying structure.

In the corners formed by two connecting walls, a batten is placed on each wall, into the corner. These two battens are screwed together using Ø6 mm x 80 mm screws.

The internal battens extend from the base runner to the top runner. Every fourth batten must extend up to the next floor, where it is fixed to the upper floor battens using three Ø6 mm x 120 mm screws. The battens at every end and beginning, and next to every wall opening, must be connected through to the adjacent floor level. This connection can be reinforced according to the requirements of the stability study.

6.2.10.2 External battens

22 mm x 48 mm sawn timber external battens are placed vertically every 40 cm up to the external face of the external walls. A 30 cm overlap is provided between building levels.

The external battens are screwed to the Gablok components using Ø5 mm x 50 mm screws. In order to do this, 2 screws are used per block, on the middle of the base runner, the top runner, and 40 mm from each joint between the rows. The printed grid on the rain barrier simplifies the alignment of the battens and screws with the underlying structure.

6.2.11 Anchors

6.2.11.1 Tie-down

The walls are anchored to the foundations using a tie-down, which is fitted to every fourth internal batten and where considered necessary according to the stability study. It is necessary to start and end with a tie-down, which is fitted at the end of each wall, in each angle and along the wall openings.

The tie-Downs are anchored in the foundations using an SKR 12x140 screwless anchor. The tie-downs are fastened to the internal battens using at least 12 or more Ø5 mm x 50 mm screws according to the specifications of the stability study.

6.2.11.2 Additional reinforcements

If the stability study indicates inadequate bracing resistance, the Gablok walls can be reinforced using additional OSB-3 panels. As a result, the shorter walls, measuring from 0.9 m, can contribute to horizontal resistance. Or the horizontal resistance of walls measuring 2.4 m or more can be increased.

The additional reinforcement is applied to the internal face of the wall before the internal battens are fitted. In order to do this, vertical columns measuring 90 mm x 264 mm or 180 mm x 264 mm are integrated in the wall, which are anchored to the foundations using tie-downs. The OSB-3 panels are placed horizontally, while the tongue and groove assembly between the panels is glued using structural adhesive. The panels are fastened to the base runner, top runner and applied columns. They must be fastened according to the details and specifications of the stability study.

Another possibility would be to use Rothoblaas LBB 1.5/40, LBB 1.5/60 or LBB 1.5/80 metal strips in crosswise arrangement. They must be fastened according to the details and specifications of the stability study.

6.2.12 Sloping roof composition

The sloping roof composition does not form part of this approval. These roofs are considered to be executed according to the current standards. They are connected to the construction system according to the details provided.

6.2.12.1 Truss roof

Truss roofs are designed so that the system walls are not subject to horizontal forces as a consequence of vertical loads. These horizontal forces can be absorbed by the truss construction itself, by the floor construction, or by an additional beam. These components can be calculated according to Eurocode 5.

6.2.12.2 Purlin roof

A recess can be made in the top row of Gablok components in order to fit purlins. These purlins are supported by the vertical reinforcements included in the wall up to the base runner on the ground floor.

6.2.13 External joinery

External joinery does not form part of this approval. It is considered to be executed according to the current standards. It is joined to the construction system according to the details provided.

6.2.14 External finish

The external face of the construction system can be finished with all conventional and appropriate materials suitable for a timber-frame construction, based on a two-step waterproof barrier system: with a drained and ventilated cavity between the exterior finishing and the rain barrier. Including wood, bricks and panels.

The external finish does not form part of this approval technique. All external finishes must be designed and implemented according to the current standards. Any loads on the finishes are included in the dimensioning of the whole structure and its components.

The details may vary depending on the type of external finish. The details on some standard external finishes have been listed in this approval.

6.2.15 Internal finish, internal joinery and technical installations

The internal finish, internal joinery and technical installations are not part of this approval. Any loads on the finishes are included in the dimensioning of the whole structure and its components.

7 Performance

7.1 Mechanical resistance and stability

7.1.1 General

Stability is assessed, based on calculations conducted according to Eurocodes: EN 1990, EN 1991, EN 1995, EN 1998 on an individual project basis.

The maximum standard height for the wall system is 9 rows of Gablok components or 2.7m, without counting the cellular concrete and floor/roof composition. Any walls higher than this, for example along openings in the floor, must be provided with additional reinforcement.

The following characteristic values have been determined by means of tests conducted on the Gablok system according to the requirements of NBN EN 1990 – Annexe D, which can be applied to the calculations according to the above-mentioned Eurocodes. In order to do this, the characteristic values are converted into calculation values according to the following formula:

$$X_d = k_{mod} \frac{X_k}{\gamma_M}$$

The failure response is primarily driven by the mechanical connections in the system. This implies the use of the partial factor for material properties for joints: $\gamma_M = 1{,}30$.

The modification factor k_{mod} takes into account the influence of the load duration and moisture conditions. It is advisable, for external walls, to adopt service class 2 and, for the internal walls, service class 1.

Any deformations can be assessed using the standard NBN B 03-003: 2003 (specifications also listed in the STS 23-1).

7.1.2 Vertical stability: dead weight and live loads

7.1.2.1 Walls

7.1.2.1.1 Gablok walls

The vertical load capacity of the walls has been determined by means of tests conducted on 1.2 m long walls. A wall consisting of 9 rows of Gablok components, including insulation and battens, was built on a layer of cellular concrete and covered with a face plate (applied eccentrically in the same way as the support of a standard floor). This configuration was subjected to a quasi static vertical load up to the point of rupture. This test was repeated three times, and the characteristic load capacity in kN/m³ and a corresponding rigidity in kN/m/mm were determined from these results.

Table 2 – Vertical load capacity

Characteristic resistance	Average rigidity
[kN/m]	[kN/m/mm]
173.2	14.3

Table 3 – Vertical load capacity according to load duration

Design value according to load duration (kN/m)[1]				
Prolonged $k_{mod} = 0{,}30$	Long $k_{mod} = 0{,}40$	Medium $k_{mod} = 0{,}55$	Long $k_{mod} = 0{,}70$	Very short $k_{mod} = 0{,}90$
40.0	53.3	73.3	93.3	119.9

(1): service class 2 (external walls)

7.1.2.1.2 Timber frame walls

Timber-frame walls (partitions and internal walls) can be calculated using Eurocode 5.

In the event of fire, the maximum vertical load capacity of the walls can be determined using the devices described in the test report.

7.1.2.2 Floors

The maximum load capacity of the floors is determined on a project basis.

The resistance, deformations according to NBN B 03-003: 2003 and vibrations can be inspected according to Eurocode 5.

7.1.3 Horizontal stability: bracing resistance

7.1.3.1 Floors and flat roofs

Floors and flat roofs act like a diaphragm in order to divert wind loads on façades to transversal walls, where they are absorbed and diverted towards the foundations.

The calculation can be conducted on the basis of Eurocode 5.

7.1.3.2 Walls

7.1.3.2.1 Gablok walls

This relates to the horizontal load resistance in the plane of the wall in terms of wind bracing. The values listed in 0 relating to resistance and rigidity are based on tests conducted according to NBN EN 594. The values apply to floor to ceiling height walls with a minimum length of 2.4 m. Any wall components less than 2.4 m long, or the parts below and above window openings, are not considered to contribute to resistance.

If the permanent vertical load applied to the top of the wall is greater than 12.5 kN/m, increased bracing resistance may be permitted for the wall.

In practice, the wall rigidity will be a decisive factor for horizontal stability. For this reason, a bracing resistance analysis must always include an inspection of deformations in service limit state. The resistance values listed in 0 are informative in this view.

Horizontal deformations in the upper part of the wall can be determined using the rigidity values R listed in 0., which can be assessed according to the standard NBN B 03-003:2003.

If the walls described in the project are not suitable in terms of providing adequate bracing resistance, the walls can be provided with additional reinforcement by means of columns, additional OSB panels or metal cross banding according to paragraph 6.2.11.2. Walls that are less than 2.4 m long but longer than 0.9 m can be considered in this analysis. This calculation is conducted using Eurocode 5.

Table 4 – Horizontal resistance in the plane, walls ≥2,4 m

Permanent vertical load	Characteristic resistance	Design value[1]	Rigidity[2]
[kN/m]	[kN/m]	[kN/m]	[kN/m/mm]
0	9.5	6.6	0.23
12.5	11.5	7.9	0.32

(1): $k_{mod} = 0{,}90$ and $\gamma_M = 1{,}3$

(2): Force in kN/m applied at the top of, and in line with, the wall, resulting in a displacement of 1 mm at the top of a full storey height wall.

7.1.3.2.2 Timber frame walls

Timber-frame walls (partitions and internal walls) can be calculated using Eurocode 5.

If the party walls between housing units need to provide bracing as part of the horizontal stability of the building, the relevant panels must be suitable for this purpose (e.g. type DuraGyp Comfort).

7.1.4 Horizontal stability: bending strength

7.1.4.1 Walls

This refers to resistance to wind action perpendicular to the wall plane. The horizontal resistance of the walls has been determined by means of tests conducted on the 1.2 m long walls. A wall consists of 9 rows of Gablok components, including insulation and battens. These components were placed horizontally, in the most negative configuration, and subjected to a four point bending test, up to the point of rupture. This test was repeated three times, and the characteristic resistance in kN/m² and a corresponding rigidity in kN/m²/mm were determined from these results.

The horizontal deformations at half the height of the wall can be determined using the supplied bending rigidity. This can be assessed according to the standard NBN B 03-003:2003.

Table 5 – Horizontal resistance in the plane perpendicular to the surface

Characteristic resistance	Design value[1]	Bending rigidity[2]
[kN/m²]	[kN/m²]	[kN/m²/mm]
9.95	6.89	0.80

(1): $k_{mod} = 0{,}90$ and $\gamma_M = 1{,}3$

(2): Force in kN/m² perpendicular to the wall plane, resulting in a displacement of 1 mm at half height of a full storey height wall.

7.1.5 Horizontal stability: seismic load

The seismic capacity of the system has not been assessed as part of this ATG. For a building located in a seismic zone, a separate study must be conducted according to Eurocode 8.

7.2 Fire safety

7.2.1 Single-family houses

Single-family houses do not fall within the scope of the Royal Decree of 07/07/1994 establishing basic standards for fire and explosion protection, and its annexes, which must be met by new buildings. This exclusion does not include party walls between housing units, which must meet a fire-separating function EI60 in the event of fire (Conseil supérieur de la sécurité contre l'incendie et l'explosion 'CS/1352/10/04 – Maison unifamiliale', May 2010).

7.2.2 Party walls between separate housing units for single-family houses

The party wall between two adjacent single-family houses consists of two independent timber-frame walls, each of which must meet a performance standard in terms of fire resistance (REI 60) in the event of fire, which refers to the slide-in panel. (BUILDWISE-contact 2013-1: Édition spéciale: la construction en bois - § 2.1 Critères acoustiques et résistance au feu des murs mitoyens).

This resistance is obtained by building each wall as a timber-frame bearing wall, which is filled with mineral wool and covered on its internal face with a double covering of 15 mm plasterboard, according to the specifications of the assessment report (ISIB Avis Technique 2017-A-041 – Rév. 1). Cf. description in paragraph 4.3.

The general rule states that floor or roof beams cannot rest on these walls, in order to guarantee the continuity of fire insulation throughout the wall. If this is not the case, the person responsible for the design will be required to conduct a special study. The joints between walls/floors and between walls/roofs must be designed so that the continuity of the EI 60 protection for walls is guaranteed.

7.3 Health, Safety and Environment

7.3.1 Ventilation

The PEB regulations and NBN B 50-001 "Ventilation systems in residential buildings" shall apply.

Ventilation system and installation does not form part of the construction system.

7.3.2 Formaldehyde emissions

The OSB-3 panels, from which Gablok components are made, meet Class E1 in terms of formaldehyde emissions with a value of <0.03 ppm. All the other panels used in the Gablok system, such as those used for covering floors and internal walls, meet at least formaldehyde emissions class E1.

7.3.3 PCP

The OSB-3 panels used to make Gablok components have a PCP level <3ppm.

7.4 Safety in use

No impact resistance has been assessed on the basis of a test. Based on experience, the impact resistance of wall and floor systems is assessed as adequate for use (EAD 340308-00-0203: Timber Building Kits; EOTA TR 001: Determination of impact resistance of panels and panel assemblies).

Any additional finishes must be assessed on a case by case basis. They do not form part of this approval.

7.5 Noise protection

7.5.1 Reference framework

NBN S 01-400-1 "Acoustic criteria for residential buildings" shall apply.

In terms of sound insulation between houses, the standard includes three comfort levels: A, B and C. While Level C sets a minimum requirement, Level B is synonymous with "normal acoustic comfort" and Level A requires "superior acoustic comfort". For party walls between two new single-family houses, the minimum comfort level is equivalent to Class B.

In addition to the specifications that apply between houses, other specifications apply to sound insulation within the interior of the house: $A_{interior}$, $B_{interior}$ et $C_{interior}$. These specifications apply only to bedrooms and offices.

Specifications for sound insulation can be broken down into a specification for airborne sound insulation and another specification for contact sound insulation. A distinction is also made between a general specification and an additional "low frequency" specification.

7.5.2 Party walls between separate housing units for single-family houses

Party walls are separated at the building foundations and any connected elements.

Party walls are constructed according to the following principles, which are listed in the publication BUILDWISE-Contact 2020-03:

- Two independent timber-frame walls with a stud depth of 140 mm.
- The space between the studs is filled with mineral wool.
- The internal face of the timber-frame walls is covered with panels with a surface density of at least 16 kg/m².
- On the cavity side, there are no panels and only a PE sheet, which is applied in order to protect against inclement weather during the construction phase.

A wall constructed according to these principles meets Class B for sound insulation.

If a higher level of comfort is desired, the panel weight can be increased, or an additional internal cavity wall for the integration of technical installations can be added.

7.5.3 Floors and walls inside the house

The level of sound insulation within the house is very highly influenced by the applied finishes.

In this respect, the floors can be assessed as simple timber-frame floors. The efficiency of floating floors and suspended ceilings increases in line with the surface density and level of decoupling.

For internal walls, acoustic comfort can be increased by adding additional finish panels. Additional acoustic decoupling can be provided by means of grooved battens, with the cavity being filled with fibrous insulation.

7.6 Thermal performance

7.6.1 Thermal resistance

The thermal resistance or R value is calculated on the basis of the standard composition, as described in this document.

The ground floor, flat roof finish and sloped roof finish do not form part of this approval. As a result, no thermal performance has been determined for these components as part of this ATG. Solutions for these components are assessed on a project basis.

The insulation value of the EPS insulation blocks is 0.04W/(mK).

Table 6 – Calculation of R values according to the reference document for transmission losses

Component	Composition	Lambda value	R-value
		[W/(mK)]	[(m²K)/W]
External wall	18 mm OSB-3	0.13	0.14
	EPS 264 mm (88%)+ OSB-3 264 mm (12%)	0,04 + 0,13	5.20
	18 mm OSB-3	0.13	0.14

7.6.2 Heat transmission coefficient

The thermal transmission coefficient or U value can be calculated using the following formula:

$$\frac{1}{U} = R_{si} + \sum R_i + R_{se}$$

In which R_{si} and R_{se} represent the thermal transmission resistance of the internal/external surfaces and $\sum R_i$ represents the sum of the thermal resistances of the successive construction layers.

7.6.3 Construction nodes

The construction system is accompanied by a multitude of joints or construction nodes between the different system components or external components (foundations, roofs, joinery, etc.). They are assessed according to regulations for energy performance on a project basis.

7.6.4 Other energy economy and thermal insulation specifications

See regional legislation.

8 Objective and scope of the Technical Approval

This technical approval is based on the favourable evaluation of the system (as described above) by an independent approval body designated by UBAtc, BCCA/WOOD.BE, for the application listed in this technical approval.

The technical approval serves as a record of the approval inspection. This inspection consists of the following: identification of relevant properties of the system for the intended application, laying/installation method, system design and reliability of production.

The Technical Approval provides a high level of reliability, based on the statistical interpretation of inspection results, regular monitoring and adjustments, in order to keep abreast of the situation, the latest technical developments and quality monitoring by the Approval Holder.

In order to retain the Technical Approval, the Approval Holder must continuously provide evidence that he is taking all necessary steps to demonstrate that the system is suitable for use. In order to do so, it is vital that the conformity of the system with the Technical Approval is monitored. This monitoring is entrusted by the UBAtc to an independent certification body known as BCCA/WOOD.BE.

The approval holder [and the distributor] is [are] required to adhere to the inspection results described in the technical approval if he makes information available to third parties. The UBAtc or certification body may take any steps that become appropriate if the approval holder [or the distributor] intentionally fails to do so (to a sufficient extent).

The Technical Approval and certification for conformity of the system to the Technical Approval are independent of tasks conducted individually. The contractor and/or architect remain fully responsible for the conformity of the completed work with the provisions contained in the specifications.

The technical approval does not cover, unless stated in specific provisions, on-site safety, health and safety aspects and the sustainable use of raw materials. As a result, the UBAtc shall not be responsible, under any circumstances, for any damage caused by the failure of the approval holder, contractor(s) and/or architect to respect provisions relating to on-site safety, health aspects and the sustainable use of raw materials.

The contract between the purchaser and seller must mention explicitly that the approval conditions have been met, as well as the name of the person responsible for installation. This must be confirmed using the attached “Declaration of Conformity”. Any non-essential exemptions are permitted, provided they are listed in the “Declaration of Conformity” and approved by the client and/or his architect.

Note: in this technical approval, the word "contractor" will always be used when referring to the entity that completes the work. This word has the same meaning as other frequently used words, such as "operator", "installer" and "fitter".

CONDITIONS FOR USE AND MAINTENANCE OF THE ATG

A. This technical approval refers exclusively to the construction product mentioned on the cover page of this document.

B. The approval holder and, if applicable, the distributor are not permitted, in any way, to use the name of the UBAtc, its logo, the technical approval mark, the technical approval or the approval number to demand the evaluation of products that fail to comply with the Technical Approval or products, including their properties or characteristics, which do not form the object of the technical approval.

C. The technical approval is based on the available knowledge and technical/scientific information, together with information provided by the applicant and complemented by an approval inspection, which takes account of the specific nature of the product. However, users remain responsible for selecting the product, equipment or system, as described in the technical approval, for the specific use intended by the user.

D. Only the approval holder and, if applicable, the distributor may assert rights based on the technical approval.

E. Any references to the technical approval must be accompanied by an identification number (ATG XXXX) and the validity period.

F. The approval holder and, if applicable, the distributor is required to adhere to the inspection results described in the technical approval if they make information available to third parties. The UBAtc or certification body may take any steps that become appropriate if the approval holder [or the distributor] intentionally fails to do so (to a sufficient extent).

G. Information provided in any way by the approval holder, distributor or an approved contractor or by their representatives for (potential) users of the product, which is described in the technical approval (e.g. for clients, contractors, architects, consultants, designers, etc.) must not be incomplete or contradict the content of the technical approval or information mentioned in the technical approval.

H. The UBAtc, the approval body and the certification body cannot be held responsible for any damage or adverse consequences suffered by third parties that result from the failure of the approval holder or distributor to respect the provisions of this document.

I. This technical approval shall remain valid, provided the product, its manufacture and all processes that are appropriate for this purpose:

- are maintained, in order to achieve, as a minimum, the inspection results defined in the approval document;
- are continuously monitored by the certification body, which confirms that the certification continues to be valid;

If these conditions are no longer met, the technical approval shall be suspended or withdrawn and the approval document shall be deleted from the UBAtc website.

J. The approval holder is bound at all times to provide UBAtc, the approval body and the certification body with prompt or prior notification of any adjustments made to primary materials and products, installation instructions and/or the manufacturing, installation and equipment process. According to the information communicated, the UBAtc, the approval body and the certification body will judge whether it is necessary to adjust the technical approval.

This technical approval has been published by UBAtc, under the responsibility of the approval body SECO/Buildwise, and based on favourable feedback from the specialist “Main structure and construction systems” group, issued on 17 April 2024.
In addition, the BCCA certification body has confirmed that the production process meets the conditions for certification and that a certification agreement was signed by the approval holder.

Date of issue: 3 September 2024.

For **UBAtc**, declaration of the validity of the approval process

Eric Winnepenninckx
Director

Frederic De Meyer
Director

For the approval and certification bodies

Buildwise

Olivier Vandooren
Director

SECO Belgium

Bernard Heiderscheidt
Director

BCCA

Olivier Delbrouck
Director

BUtgb vzw - UBAtc asbl

The Belgian Union for Technical Approval in Construction asbl

Union belge pour l'Agrément technique dans la Construction asbl

Head office and other offices:

Kleine Kloosterstraat 23
1932 Sint-Stevens-Woluwe

Tel.: +32 (0)2 716 44 12
info@butgb-ubatc.be
www.butgb-ubatc.be

VAT: BE 0820.344.539
Register of Legal Persons of Brussels

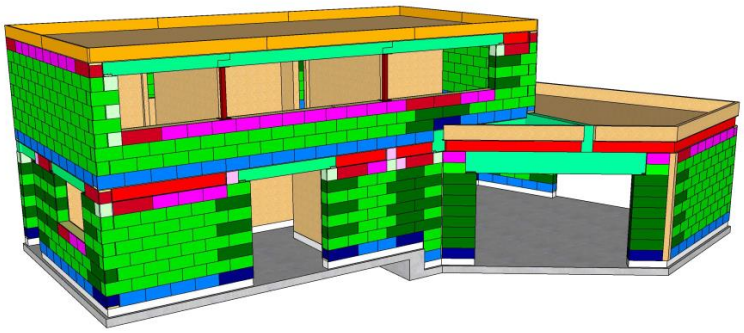
UBAtc asbl has been notified by the FPS Economy within the framework of Regulation (EU) 305/2011.

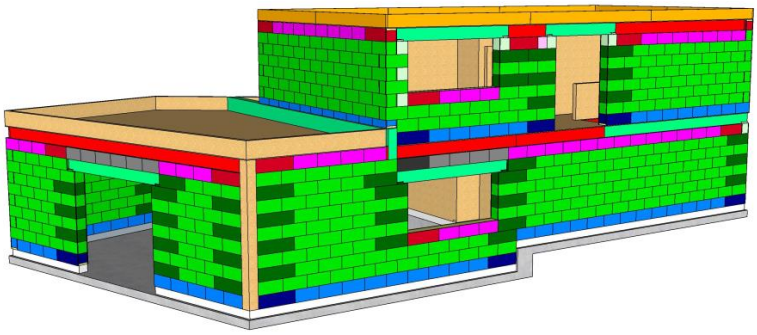
UBAtc asbl is an accredited body and member of:

ANNEXES

9 Annexes

The following pages include a number of technical details intended to illustrate the principles of the system. These details are modified if this becomes necessary according to the project specifications and form part of the project study developed under the responsibility of the ATG holder.

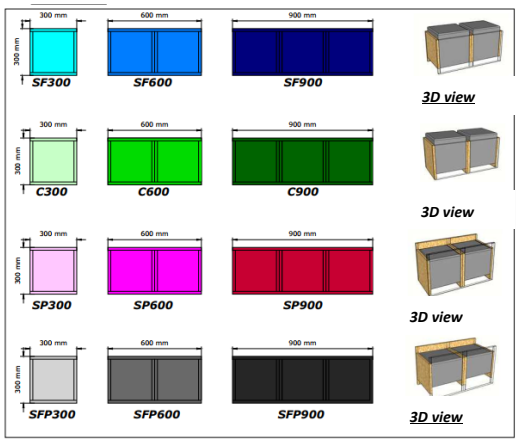




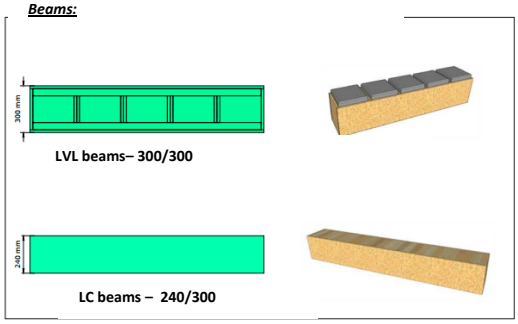
Gablok	**Adresse :** Zoning des Plénesses Rue des Waides, 18 C 4890. THIMISTER				- Plans de montage	**Plan :** Vue d'ensemble Date : 19 janvier 2024 Page : 1

Construction components:

Blocks:

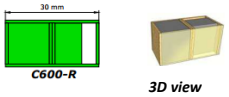


Beams:



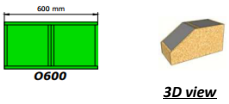
Reinforcement blocks:

*The blocks are identical, apart from the insulation, which is narrower in one of the compartments.

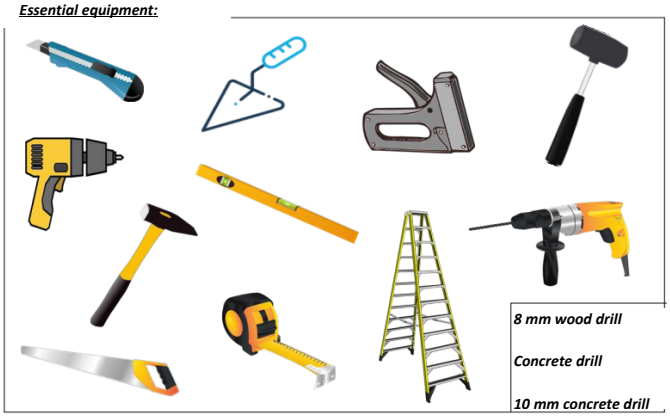


Chamfered blocks for sloped roofs:

*The blocks are identical, but are cut out at an angle in order to fit the roof slope.
Example with a C600 (becomes O600):

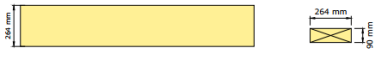
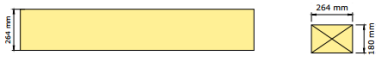
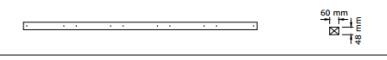
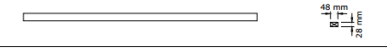


Essential equipment:

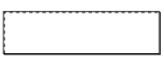


Construction components:

Blocks:

Name	Annotation	Dimensions	3D model
Flexible starter panel / top runner /bottom runner (45 x 264 mm)	***LD / SP / SS***		
Reinforcement (90 x 264 mm)	***R***		
Double reinforcement (180 x 264 mm)	***R***		
Roof stand (45 x 300 mm)	***S / AC***		
Floor beam (60 x 240 mm)	***S / M / E***		
Connecting rail (90 x 240 mm)	***LJ***		
Rafter (48/60 mm)	/		
Green batten (28/48	/		
Black batten (28/48 mm)	/		

Panels:

OSB tongue and groove OSB 3 – 675/2500 15 & 18 mm			

Screws and bolts

- SNK 5/50 : bracket for external battens
- SNK 6/80 :bracket for trusses – on beams– under trusses
- SNK 6/100 : bracket for floor collars
- SNK 6/140 : bracket for fastening joists to beam
- SNK 8/120 : bracket for wall plates on beams
- HTS 5/50 : fastener for OSB panels using mortise and tenon joints
- HTS 5/25 : fastener for fixing brackets (HT170) to the acroterion
- LBS 5/50 : fastener for fixing brackets (WZU4004) on trusses
- SKR 12/140 : fastener for fixing brackets (WZU4004) on the concrete slab
- SKR 12/400: fastener for fixing the base runner on the panel
- INA M16/180 : fastener for securing WHT540

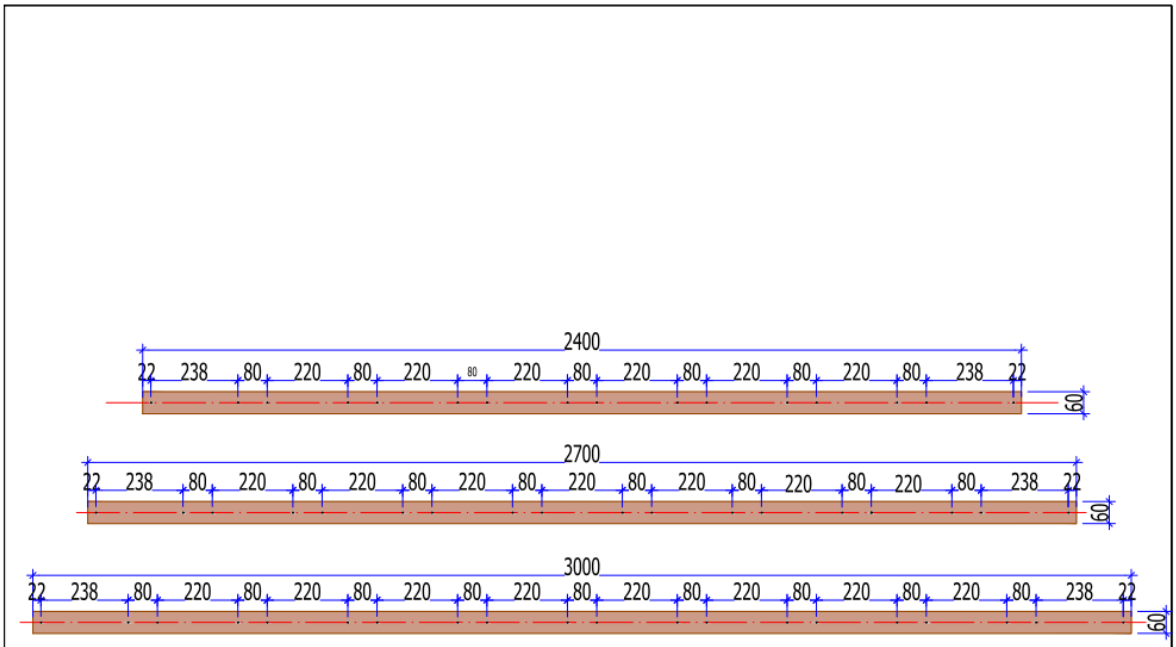
Fastener components

- HT170: securing the roof stand 
- WZU4004 : fastener for securing trusses on the floor slab 
- WHT540 : fastern for securing walls on the concrete slab 
- WZU Washer: locking ring for fixing bracket WZU4004 
- Chemical anchor : fastener for securing the threaded rod INA M12/180 
- Wood adhesive D3 : fastener securing OSB panels using mortise and tenon joints 
- Wood adhesive D4 : fastener for securin OSB panels using mortise and tenon joints as a reinforcement 

Membranes

- 1.1 mm EPDM membrane: 0,3 m x 20 m 
- VAPOR HOUSE IN 120 vapour barrier : 1.5 m x 50 m 
- TRASPIR HOUSE 110 rain barrier : 1.5 m x 50 m 
- TRASPIR EVO UV 210 rain barrier : 1.5 m x 50 m 
- SPRINTA single-sided adhesive tape: vapour barrier joint 0.6 m x 25 m 
- SIMPLA single-sided adhesive tape: rain barrier joint 0.6 m x 25 m 
- FRONT BAND UV 210 single-sided adhesive tape: UV rain barrier joint 0,6 m x 25 m 
- SIGNO single-sided adhesive tape: vapour barrier and concrete slab joint 25 m 

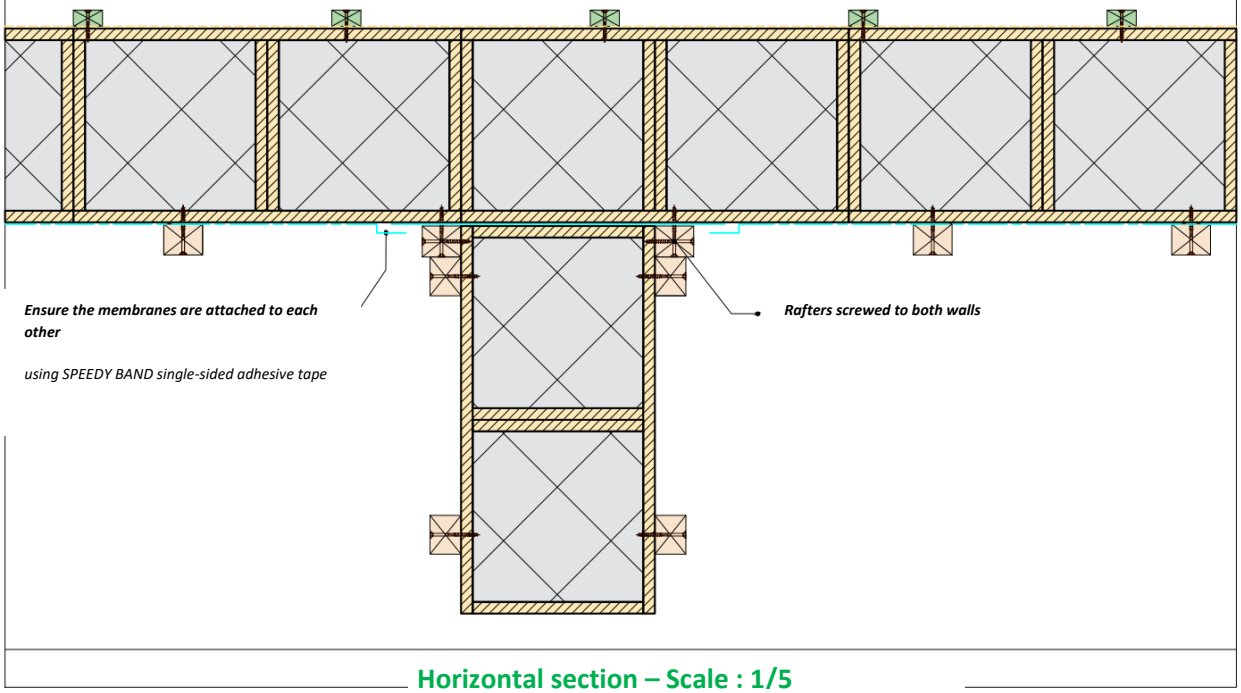
Gablok	Adres : Zoning des Plénesses Rue des Waides, 18 C 4890. THIMISTER	Contact : Thibaut Degueldre +32 472 76 45 27 thibaut@gablok.be			Assembly drawings	Plan : hardware Date : 10 januari 2024 Page : 4



Front view

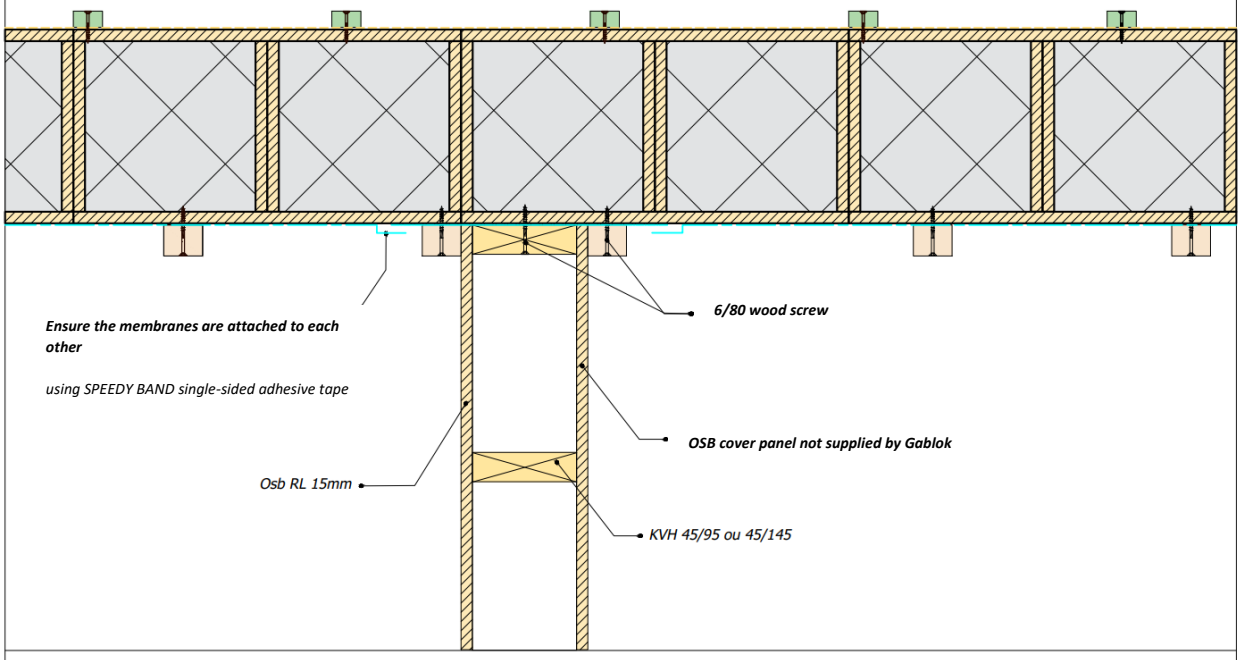
Scale: 1 :12

	Rafter	Rafter 48/60 :	2400 mm 2700 mm 3000 mm	Milled holes : ∅ 4 mm



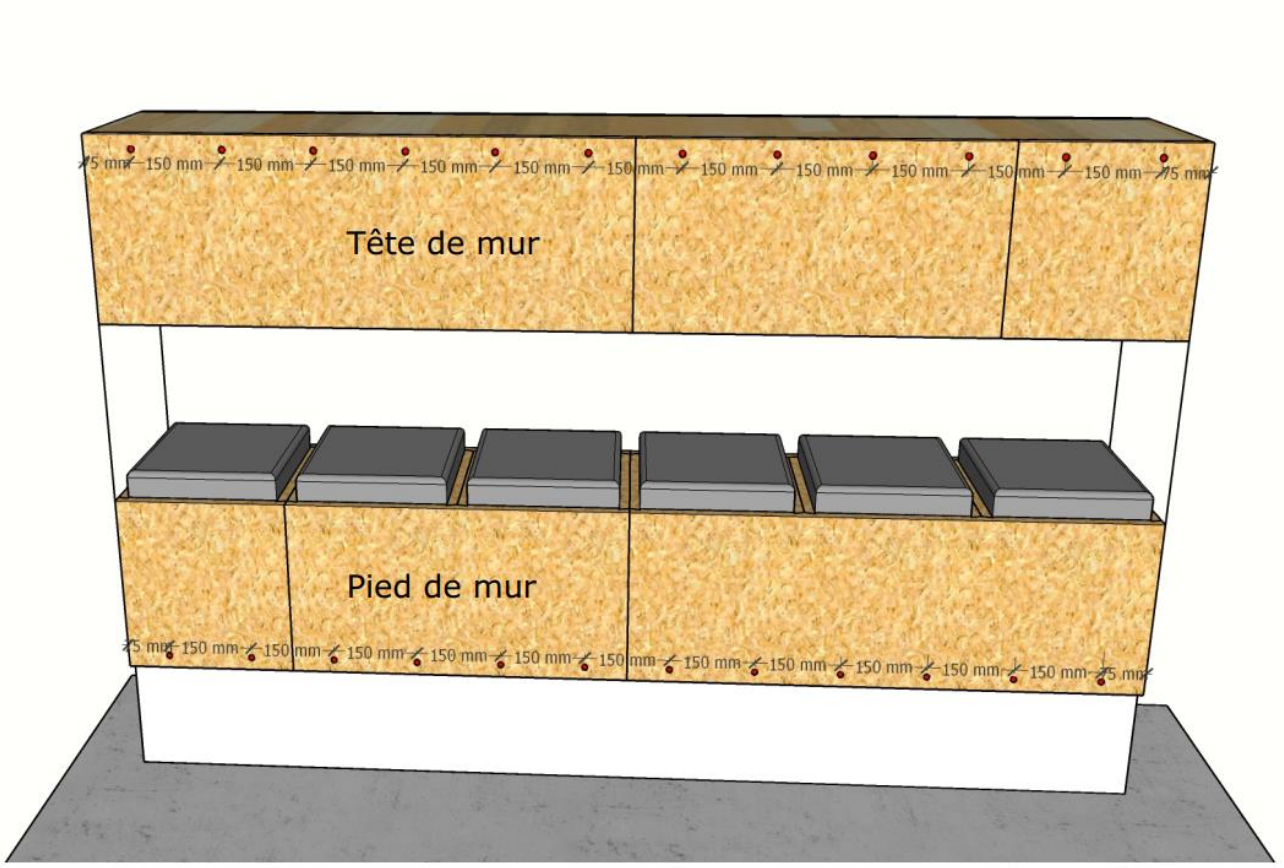
Horizontal section – Scale : 1/5

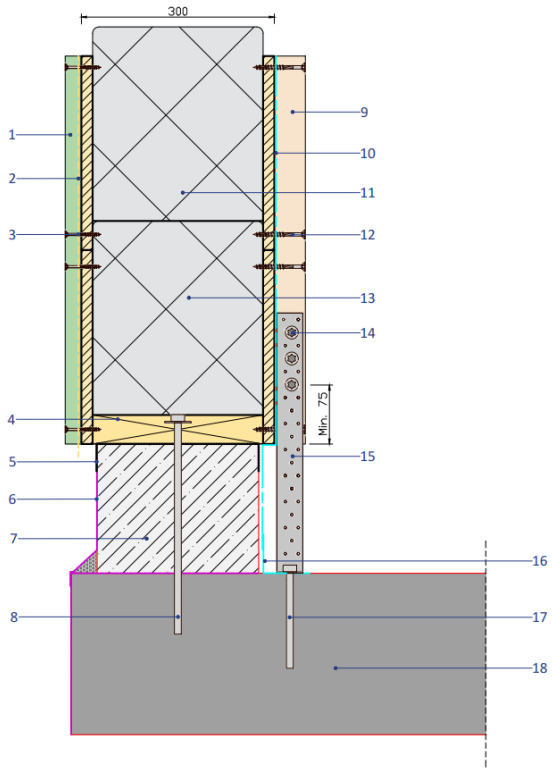
Annex 1



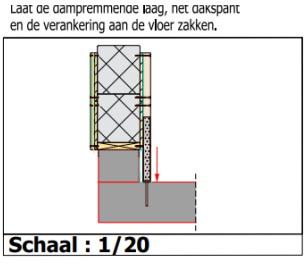
Horizontal section – Scale : 1/5

Annex 3

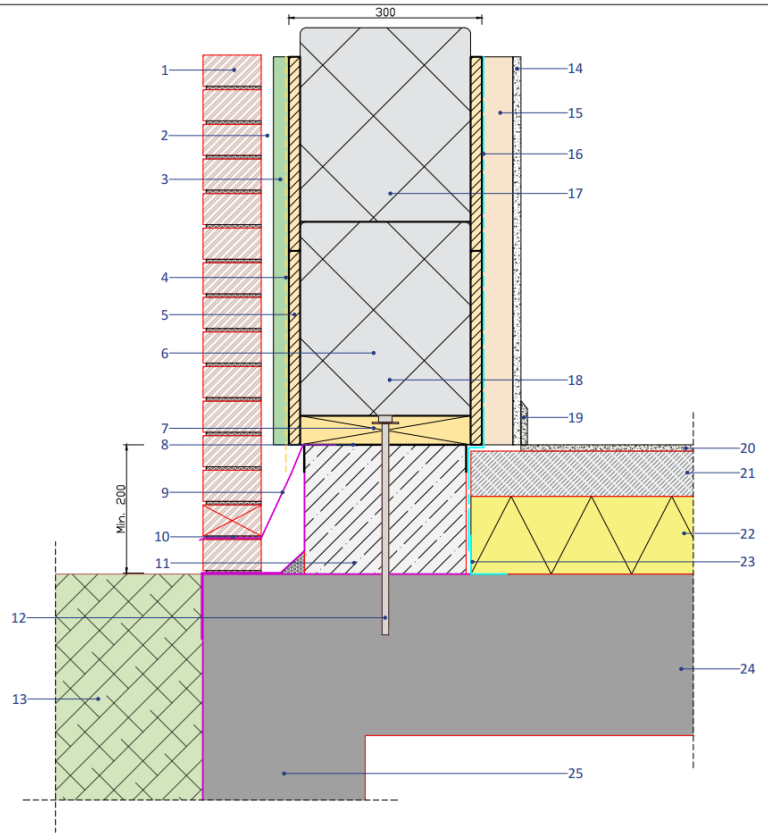




1. Battens (25/48, centre distance: 40 cm)
2. Rain barrier (Traspir 110)
3. Wood screw (5/50 or as for laths)
4. Base runner (LVL 245/264)
5. EPDM (0.7 mm)
6. Polyethylene membrane
7. Cellular concrete base block
8. SKR 12/320
9. Rafter (C18 48/60, centre distance: 40 cm)
10. Vapour barrier
11. Block C
12. Wood screw (6/80 on each hole)
13. Block SF
14. 3 x LBS screw (5/50 on the axle)
15. WZU 4004
16. Single-sided adhesive tape for vapour barrier
17. SKR 12/140

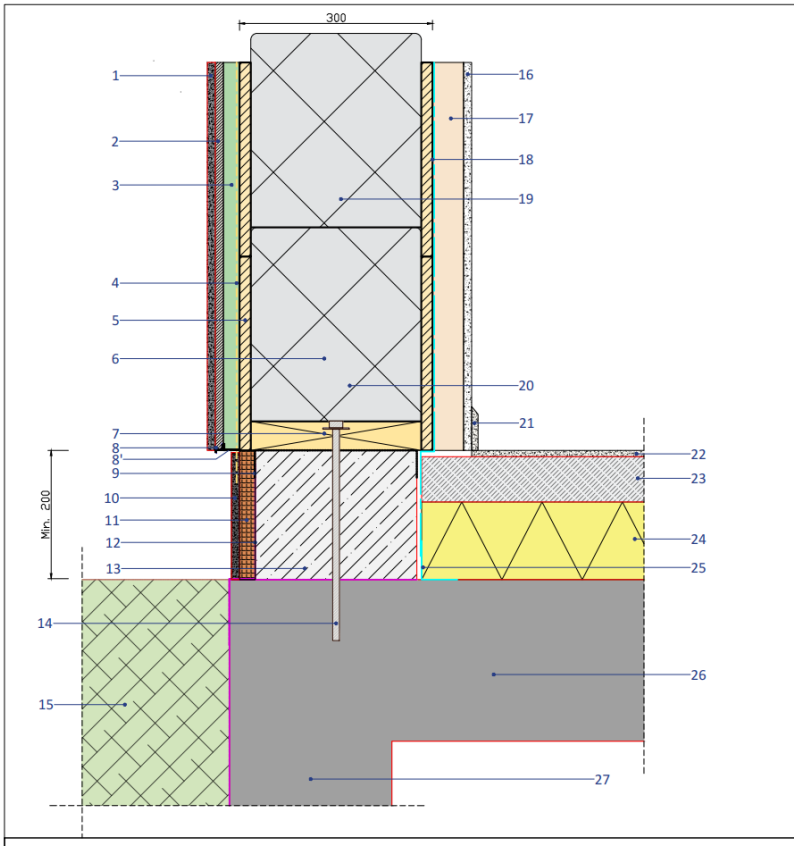


Detail N° 2.1 : Rafter anchor AF1 200 **1/5 Scale**



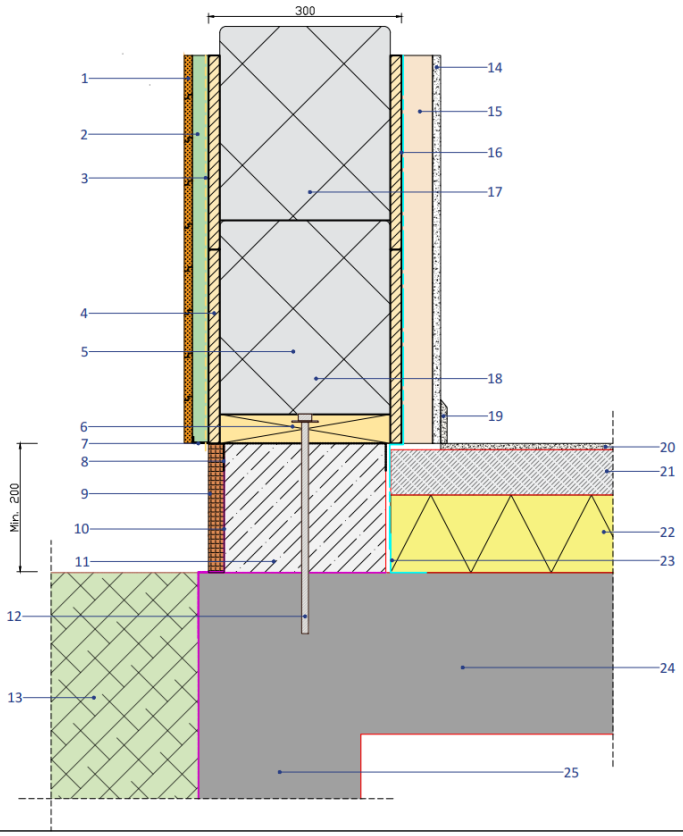
1 Brick façade cladding
2 Ventilated cavity
3 Battens (25/48, centre distance: 40 cm)
4 Rain barrier (Traspir 110)
5 18 mm OSB-3 (E0)
6 264 mm EPS (λ 0,04 W/mK)
7 Base runner (LVL 45/264)
8 EPDM (0.7 mm)
9 Polyethylene membrane
10 Open joints (e.g. 60 cm)
11 Cellular concrete base block
12 SKR 12/320
13 Natural terrain
14 Internal finish
15 Rafter (C18 48/60, centre distance: 40 cm)
16 Vapour barrier (Damp in 120)
17 Block C
18 Block SF
19 Plinth
20 Internal finish
21 Screed
22 Insulation
23 Single-sided adhesive tape for vapour barrier
24 Concrete or inverted slab C20/25 min

Detail N° 1.1: External wall base joint – masonry – Ytong 200/250 block **1/5 Scale**



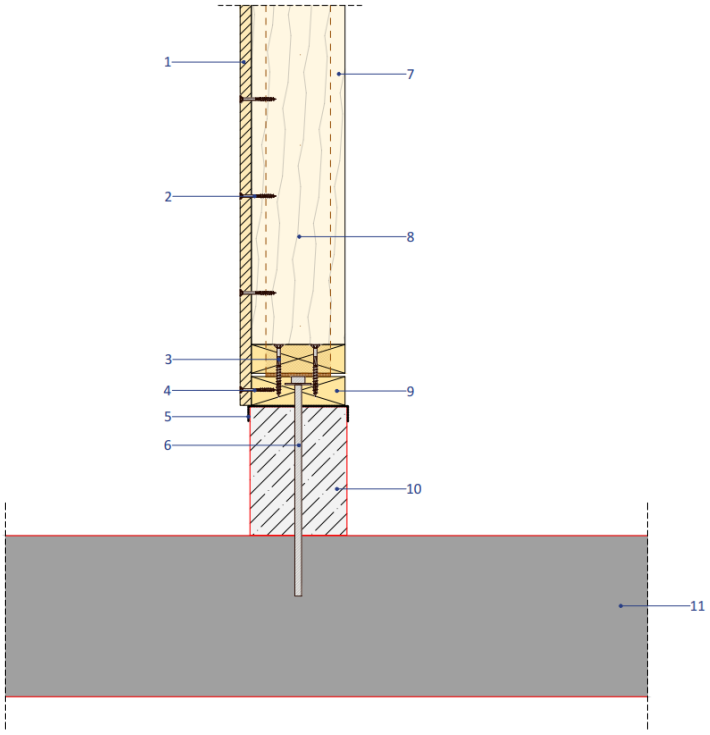
1 Rough finish
2 Plasterboard
3 Battens – ventilated cavity
4 Rain barrier (Traspir 110)
5 18 mm OSB-3 (E0)
6 264 mm EPS (λ 0,04 W/mK)
7 Base runner (LVL 45/264)
8 Starter profile
8 8': ventilation grid (min. width: 15 mm)
9 EPDM (0.7 mm)
10 Waterproof coating
11 Moisture resistant insulation
12 Polyethylene membrane
13 Cellular concrete base block
14 SKR 12/320
15 Natural terrain
16 Internal finish
17 Rafter (C18 48/60, centre distance: 40 cm)
18 Vapour barrier (Damp in 120)
19 Block C
20 Block SF
21 Plinth
22 Internal finish
23 Screed
24 Insulation
25 Single-sided adhesive tape for vapour barrier
26 Concrete or inverted slab C20/25 min
27 Cellular concrete base block
28 SKR 12/320
29 Natural terrain

Detail N° 1.2: External wall base joint - plaster **1/5 Scale**



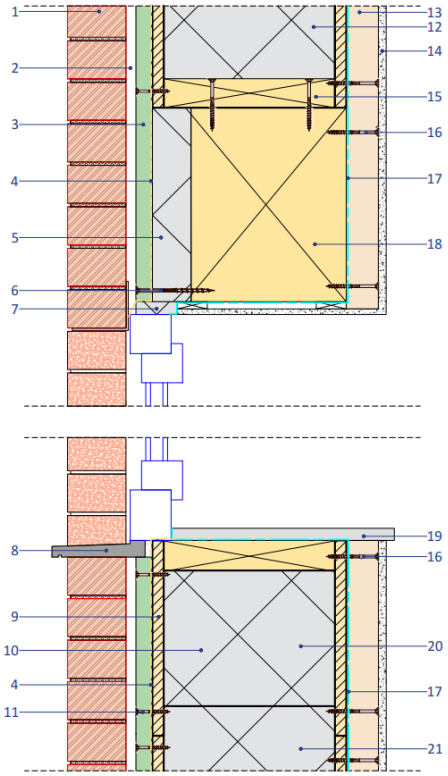
1. Coating
2. Battens (25/48, centre distance: 40 cm ventilated cavity)
3. Rain barrier (Traspir 110)
4. 18 mm OSB (3-E0)
5. 264 mm EPS (λ 0,04 W/mK)
6. Base runner (LVL 45/264)
7. Ventilation grid (min. width: 15 mm)
8. EPDM (0.7 mm)
9. Waterproof coating
10. Polyethylene membrane
11. Cellular concrete base block
12. SKR 12/320
13. Natural terrain
14. Internal finish
15. Truss (C18 48/60, centre distance: 40 cm)
16. Vapour barrier (Damp in 120)
17. Block C
18. Block SF
19. Plinth
20. Internal finish
21. Screed
22. Insulation
23. Single-sided adhesive tape for vapour barrier
24. Concrete or inverted slab C20/25 min

Detail N° 1.3 : External wall base joint – timber cladding **1/5 Scale**



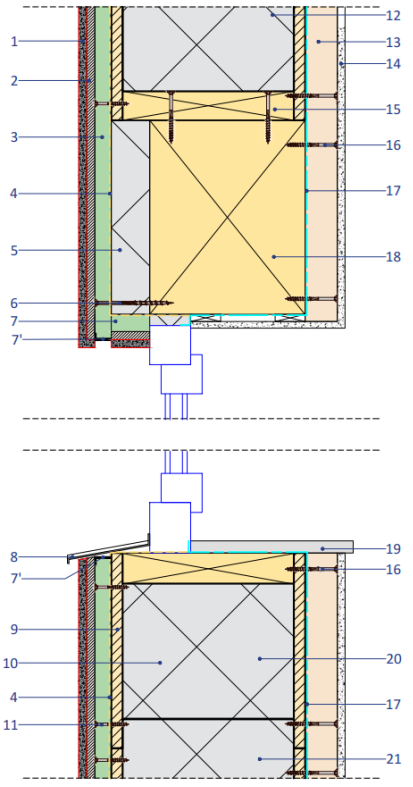
1. 15 mm OSB (3-E0)
2. Wood screw (4/50)
3. 2 x wood screw (6/80, centre distance: 60 cm)
4. Wood screw (5/50, centre distance: 15 cm)
5. EPDM (0.7 mm, 30 cm wide)
6. SKR 12/320
7. Frame (KVH 45/145, centre distance: 60 cm)
8. 5 mm jute canvas
9. Base runner (KVH 45/145)
10. Cellular concrete base block (200/150)
11. Concrete or inverted slab C20/25 min

Detail N° 2.6: Concrete slab – Gablok partition wall joint **1/5 Scale**



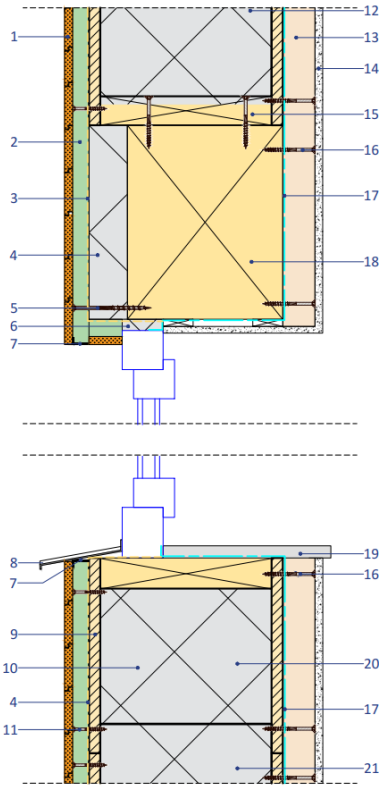
1. Brick façade cladding
2. Ventilated cavity
3. Battens (25/48, centre distance: 40 cm)
4. Rain barrier (Traspir 110)
5. 60/300 mm EPS
6. Wood screw (6/140)
7. 20 mm insulation
8. Sill
9. 18 mm OSB (3-E0)
10. 264 mm EPS (λ 0,04 W/mK)
11. Wood screw (5/50, as for laths)
12. Block SF
13. Rafter (C18 48/60, centre distance: 40 cm)
14. Internal finish
15. Mounted beam (L-C 45/264)
16. Wood screw 6 (/80 placed on each hole)
17. Vapour barrier (Damp in 120)
18. Beam (L-C 240/300)
19. Finish board
20. Block SP
21. Block CP

<u>Detail N° 3.1 :</u> External wall – stone threshold joint **<u>1/5 Scale</u>**



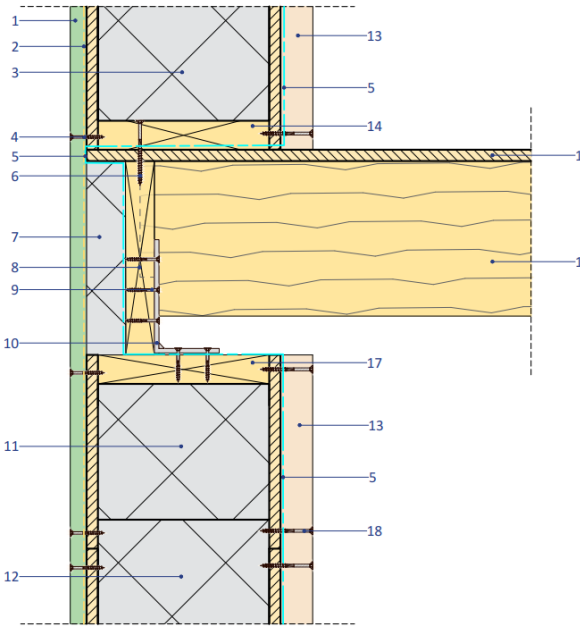
1. Rough finish
2. Plasterboard
3. Battens (25/48, centre distance: 40 cm, ventilated space)
4. Rain barrier (Traspir 110)
5. 60/300 mm EPS
6. Wood screw (6/140)
7. 20 mm insulation
7. 7' ventilation grid (min. width: 15 mm)
8. Threshold
9. 18 mm OSB (3-E0)
10. 264 mm EPS (λ 0,04 W/mK)
11. Wood screw (5/50 as for lattes)
12. Block SF
13. Rafter (C18 48/60, centre distance: 40 cm)
14. Internal finish
15. Mounted beam (L-C 45/264)
16. Wood screw 6(/80, placed on each hole)
17. Vapour barrier (Damp in 120)
18. Beam (L-C 240/300)
19. Finish board
20. Block SP
21. Block CP

<u>Detail N° 3.2:</u> External wall plaster – threshold joint **<u>1/5 Scale</u>**



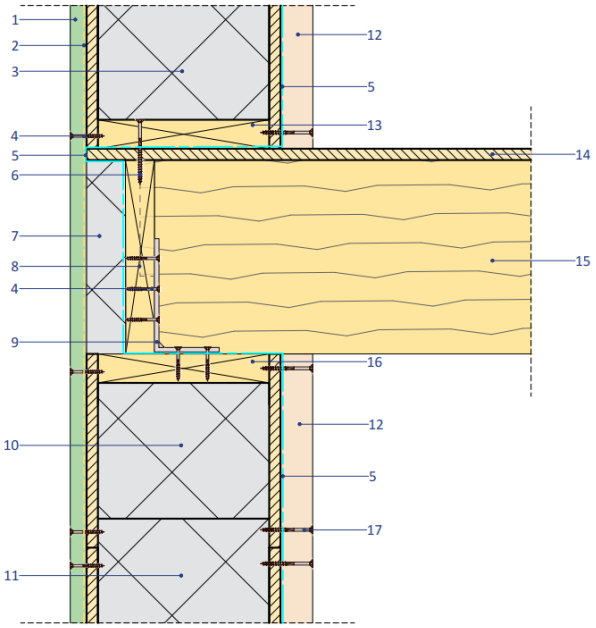
1. Coating
2. Battens (25/48, centre distance: 40 cm, ventilated space)
3. Rain barrier (Traspir 110)
4. 60/300 mm EPS
5. Wood screw (6/140)
6. 20 mm insulation
7. Ventilation grid (min. width: 15 mm)
8. Threshold
9. 18 mm OSB (3-E0)
10. 264 mm EPS (λ 0,04 W/mK)
11. Wood screw (5/50 as for lattes)
12. Block SF
13. Rafter (C18 48/60, centre distance: 40 cm)
14. Internal finish
15. Mounted beam (L-C 45/264)
16. Wood screw 6(/80, placed on each hole)
17. Vapour barrier (Damp in 120)
18. Beam (L-C 240/300)
19. Finish board
20. Block SP
21. Block CP

Detail N° 3.3 : External wall – timber cladding – threshold joint **1/5 Scale**



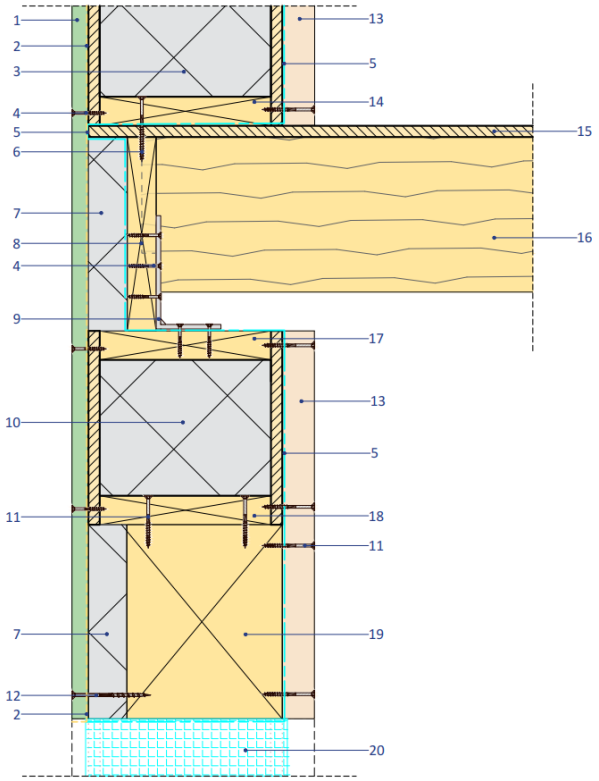
1. Battens (25/48, centre distance: 40 cm)
2. Rain barrier (Traspir 110)
3. Block SF
4. Wood screw (5/50)
5. Vapour barrier (Damp in 120)
6. Wood screw (4/80, centre distance: 60 cm)
7. 60/300 mm EPS
8. Wall mount (KVH 60/300)
9. LBS (5/50)
10. Corner bracket (WBR 170, centre distance: 120 cm)
11. Block SP
12. Block CP
13. Rafter (C18 48/60, centre distance: 40 cm)
14. Base runner (L-C 45/264)
15. 18 mm OSB (3-E0)
16. Support beam (KVH 60/240, with dovetail)
17. Lower roof edge (L-C 45/264)
18. Wood screw (6/80)

Detail N° 4.1 : External wall-perpendicular floor joint **1/5 Scale**



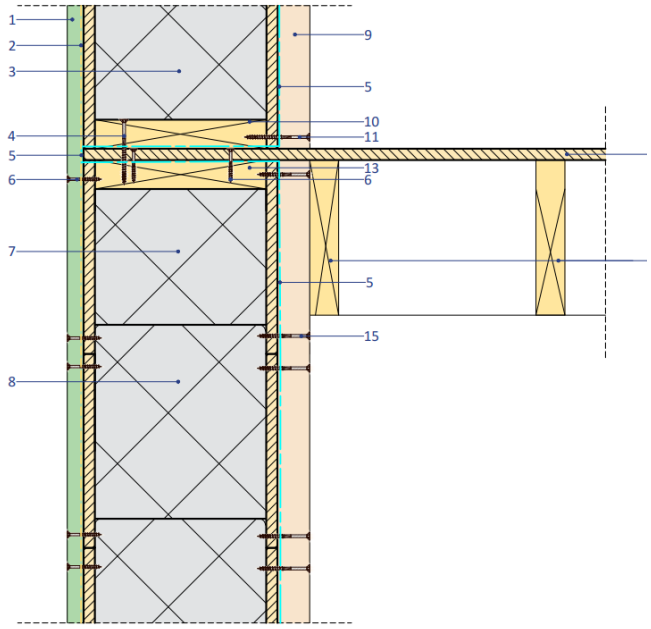
1. Battens (25/48, centre distance: 40 cm)
2. Rain barrier (Traspir 110)
3. Block SF
4. Wood screw (5/50)
5. Vapour barrier (Damp in 120)
6. Wood screw (4/80, centre distance: 60 cm)
7. 60/300 mm EPS
8. Wall mount (KVH 60/240)
9. Corner bracket (WBR 170, centre distance: 120 cm)
10. Block SP
11. Block C
12. Rafter (C18 48/60, centre distance: 40 cm)
13. Base runner (L-C 45/264)
14. 18 mm OSB (3-E0)
15. Support beam (KVH 60/300, with dovetail)
16. Lower roof edge (L-C 45/264)
17. Wood screw (6/80)

<u>Detail N° 4.2 :</u> External wall – perpendicular floor joint 60/300 **<u>1/5 Scale</u>**



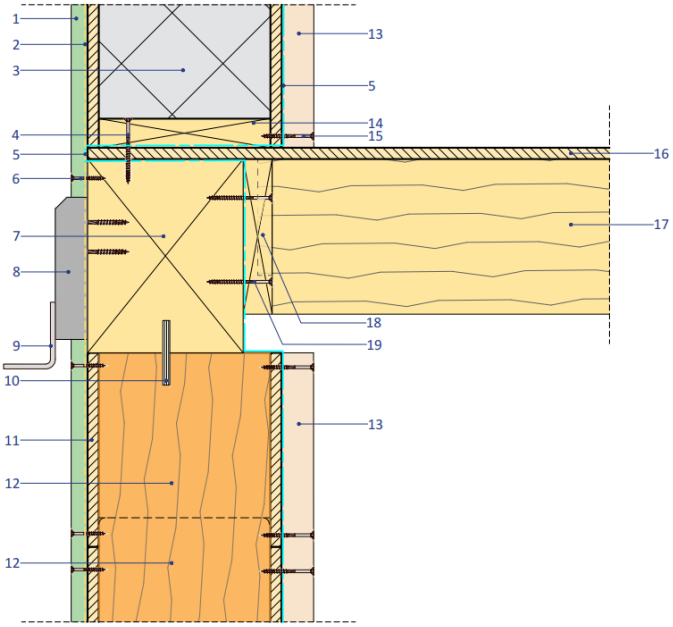
1. Battens (25/48, centre distance: 40 cm)
2. Rain barrier (Traspir 110)
3. Block SF
4. Wood screw (5/50)
5. Vapour barrier (Damp in 120)
6. Wood screw (4/80, centre distance: 60 cm)
7. 60/300 mm EPS
8. Wall mount (KVH 60/300)
9. Corner bracket (WBR 170, centre distance: 120 cm)
10. Block SFP
11. Wood screw (6/80)
12. Wood screw (6/140)
13. Rafter (C18 48/60, centre distance: 40 cm)
14. Base runner (L-C 45/264)
15. 18 mm OSB (3-E0)
16. Joist (KVH 60/240, with dovetail)
17. Lower roof edge (L-C 45/264)
18. Mounted beam (LC 45/264)
19. Beam (LC 240/300)
20. Vapour barrier folded over the edge of the recess in order to ensure it is joined to the frame

<u>Detail N° 3.4 :</u> Glulam beam joint **<u>1/5 Scale</u>**



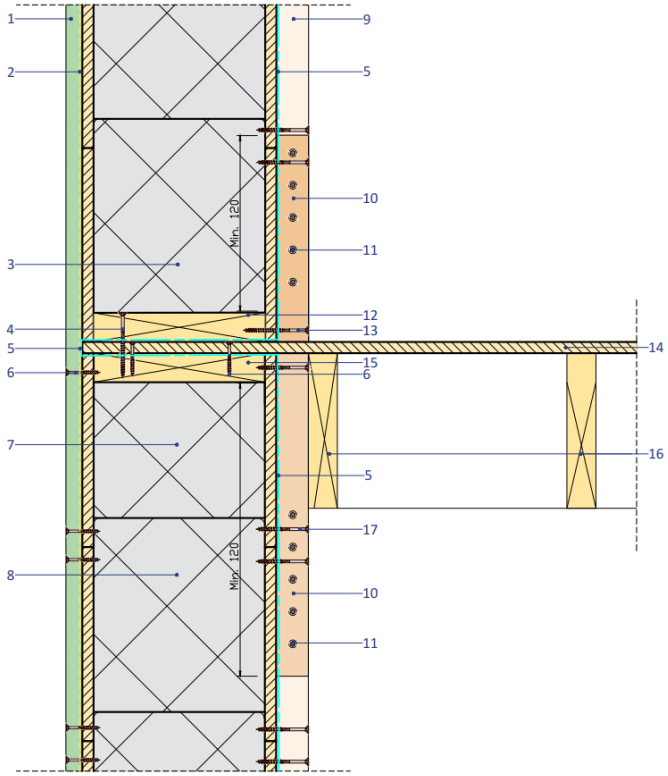
1. Battens (25/48, centre distance: 40 cm)
2. Rain barrier (Traspir 110)
3. Block SF
4. Wood screw (4/80, centre distance: 60 cm)
5. Vapour barrier (Damp in 120)
6. Wood screw (5/50)
7. Block SP
8. Block C
9. Rafter (C18 48/60, centre distance: 40 cm)
10. Base runner (L-C 45/264)
11. Wood screw (6/120)
12. 18 mm OSB (3-E0)
13. Bottom plate (L-C 45/264)
14. Joist (KVH 60/240, with dovetail)
15. Wood screw (6/80)

Detail N° 4.3 : External wall – parallel joint with floor **1/5 Scale**



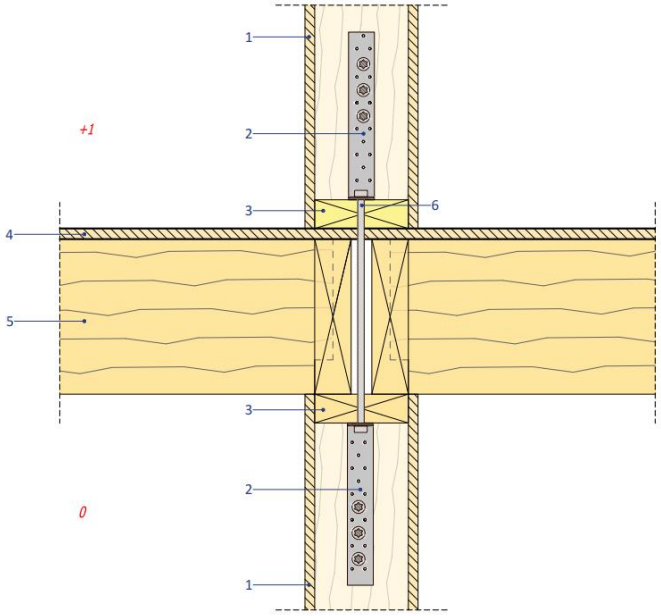
1. Battens (25/48, centre distance: 40 cm)
2. Rain barrier (Traspir 110)
3. Block SF
4. Wood screw (4/80, centre distance: 60 cm)
5. Vapour barrier (Damp in 120)
6. Wood screw (5/50)
7. Beam (LC 240/300)
8. BFS Support
9. Scaldex corner bracket
10. Dowel (20x95mm)
11. Block C-R (R = reinforcement)
12. Reinforcement (180/260)
13. Rafter (C18 48/60, centre distance: 40 cm)
14. Base runner (L-C 45/264)
15. Wood screw (6/80)
16. 18 mm OSB (3-E0)
17. Joist (KVH 60/240, with dovetail)
18. Wall mount (KVH 60/240)
19. Wood screw (6/120, centre distance de 40 cm, offset)

Detail N° 4.4: Beam – perpendicular floor – SCALDEX masonry joint **1/5 Scale**



1. Battens (25/48, centre distance: 40 cm)
2. Rain barrier (Traspir 110)
3. Block SF
4. Wood screw (4/80, centre distance: 60 cm)
5. Vapour barrier (Damp in 120)
6. Wood screw (5/50)
7. Block SP
8. Block C
9. Rafter (C18 48/60, centre distance: 40 cm)
10. Covering truss (min. 120 cm)
11. Wood screw (6/100)
12. Base runner (L-C 45/264)
13. Wood screw (6/120)
14. 18 mm OSB (3-E0)
15. Bottom plate (L-C 45-264)
16. Joist (KVH 60/240, with dovetail)
17. Wood screw (6/80)

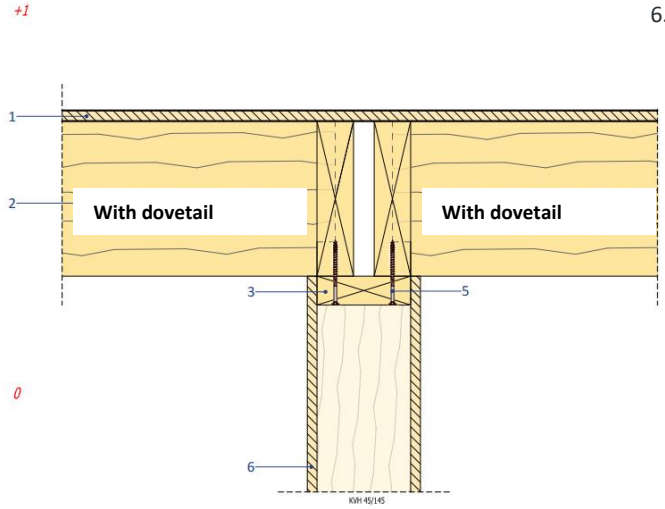
Detail N° 4.9 : internal wall – parallel floor – truss joint **1/5 Scale**



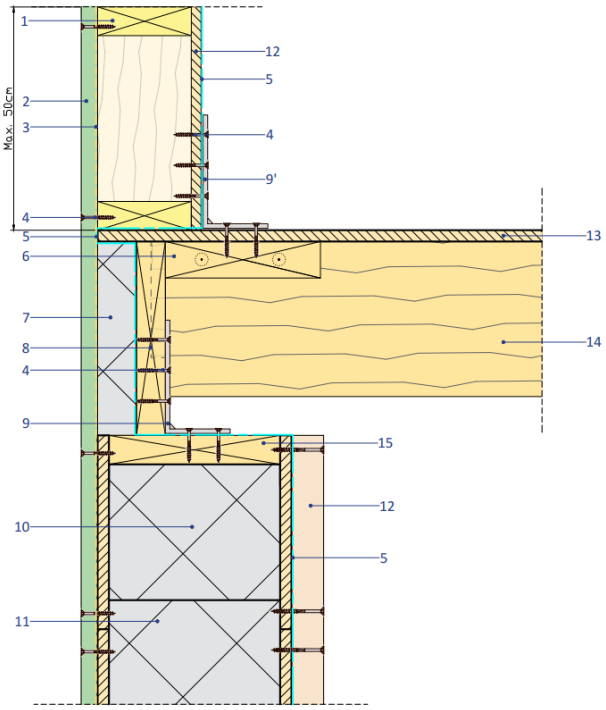
1. 15 mm OSB (3E0) compulsory on one side
2. WZU 4004 with screws (LBS 5/50) on double stud
3. Wood component (KVH 45/145)
4. 18 mm OSB (3E0)
5. Joist (KVH 60/240 with dovetail)
6. M12 rod

Detail N° 5.1 : Internal wall joint – ground floor – upper floor **1/5 Scale**

1. 18 mm OSB (3E0)
2. Joist (KVH 60/240, with dovetail)
3. Rail (KVH 45/145)
4. 15 mm OSB (3-E0) compulsory on one side
5. 2x wood screws (6/100, centre distance: 60 cm)
6. 15 mm OSB (3-E0) compulsory on one side

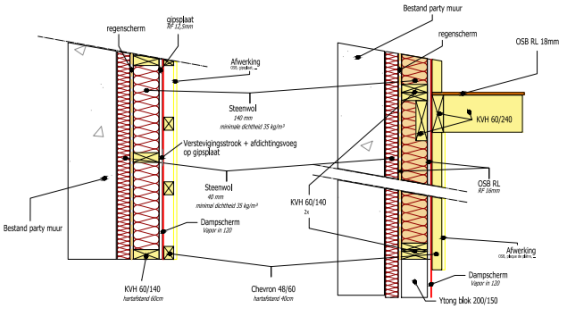


Detail N° 5.2: Perpendicular and parallel joint – internal wall/floor **1/5 Scale**

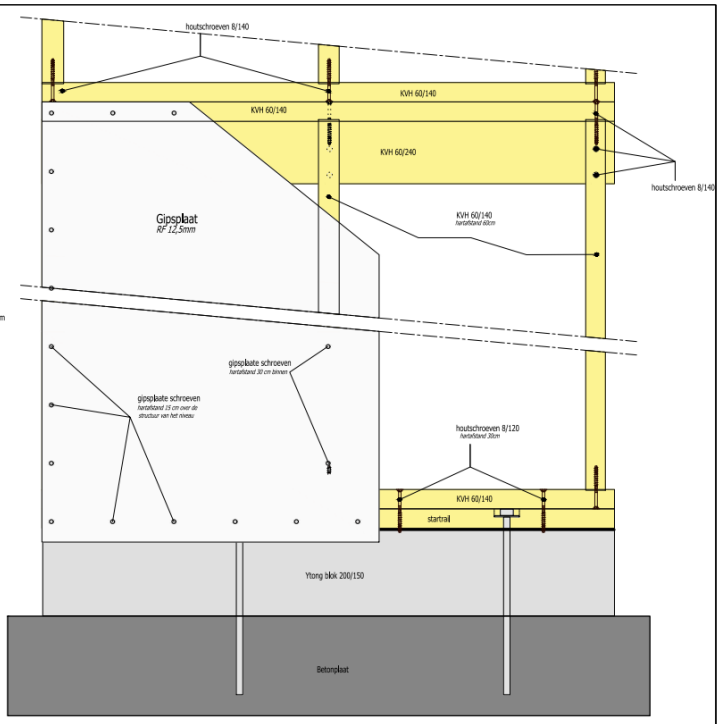


1. Roof stand (dim. 145mm) filled with mineral wool (not supplied by Gablok)
2. Battens (25/48, centre distance: 40 cm)
3. Rain barrier (Traspir 110)
4. Wood screw (5/50)
5. Vapour barrier (Vapor in 120)
6. Spacer (60/240, oblique, with 2 wood screws 6/120)
7. 60/300 mm EPS
8. Wall plate (KVH 60/300)
9. Mounting bracket (WBR 170, centre distance: 120 cm)
9. 9' square (WBR 170, centre distance: 240 cm)
10. Block SP
11. Block C
12. Truss (C18 48/60, centre distance: 40 cm)
13. 15 mm OSB (3-E0)
14. Joist (KVH 60/240, with dovetail)
15. Under roof finish (LC 45/264)

Detail N° 6.1: Flat roof – perpendicular joint between floor-acroterion **1/5 Scale**



Top section Lateral section

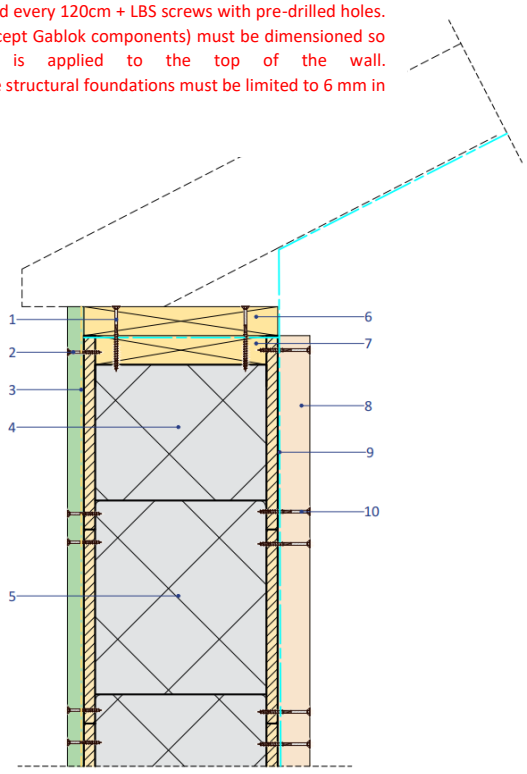


Section

Annex 4: Gablok party wall

Annex 4:

The frame is fastened to the roof edge in order to guarantee the "diaphragm" effect: 2 WBR mounting brackets placed every 120cm + LBS screws with pre-drilled holes. Caution! The roof structure (except Gablok components) must be dimensioned so that no lateral pressure is applied to the top of the wall. Any horizontal movement in the structural foundations must be limited to 6 mm in rare serviceability limit state.



1. Wood screw (6/100)
2. Wood screw (5/50)
3. Rain barrier (Traspir 110)
4. Block SP
5. Block C
6. Wall plate (LC 45/300)
7. Under wall plate (LC 45/264)
8. Truss (C18 48/660, centre distance: 40 cm)
9. Vapour barrier (Damp in 120)
10. Wood screw (6/80)

Detail N° 7.1 : Joint between the external and prefabricated structure **1/5 Scale**