

C\_Details

The information below provides an example of Stora Enso's construction proposals

## **A Shell construction**

- Plinth/Wall anchorage
- Wall joint
- Lintel
- Ceiling
- "Ground floor wall – ceiling – top floor wall" connecting nodes
- Roof
- Cantilever/coat

## **B Layer structure**

- External walls
- Internal walls
- Floor structure
- Slab (underside)
- Roof
- Party wall
- Building partition wall

## **C Details**

- Plinth/Wall anchorage
- Window connection
- Door joint
- Cantilever
- Pitched roof
- Flat roof
- Electric installation
- Sanitary installation
- Fireplace
- Stairs

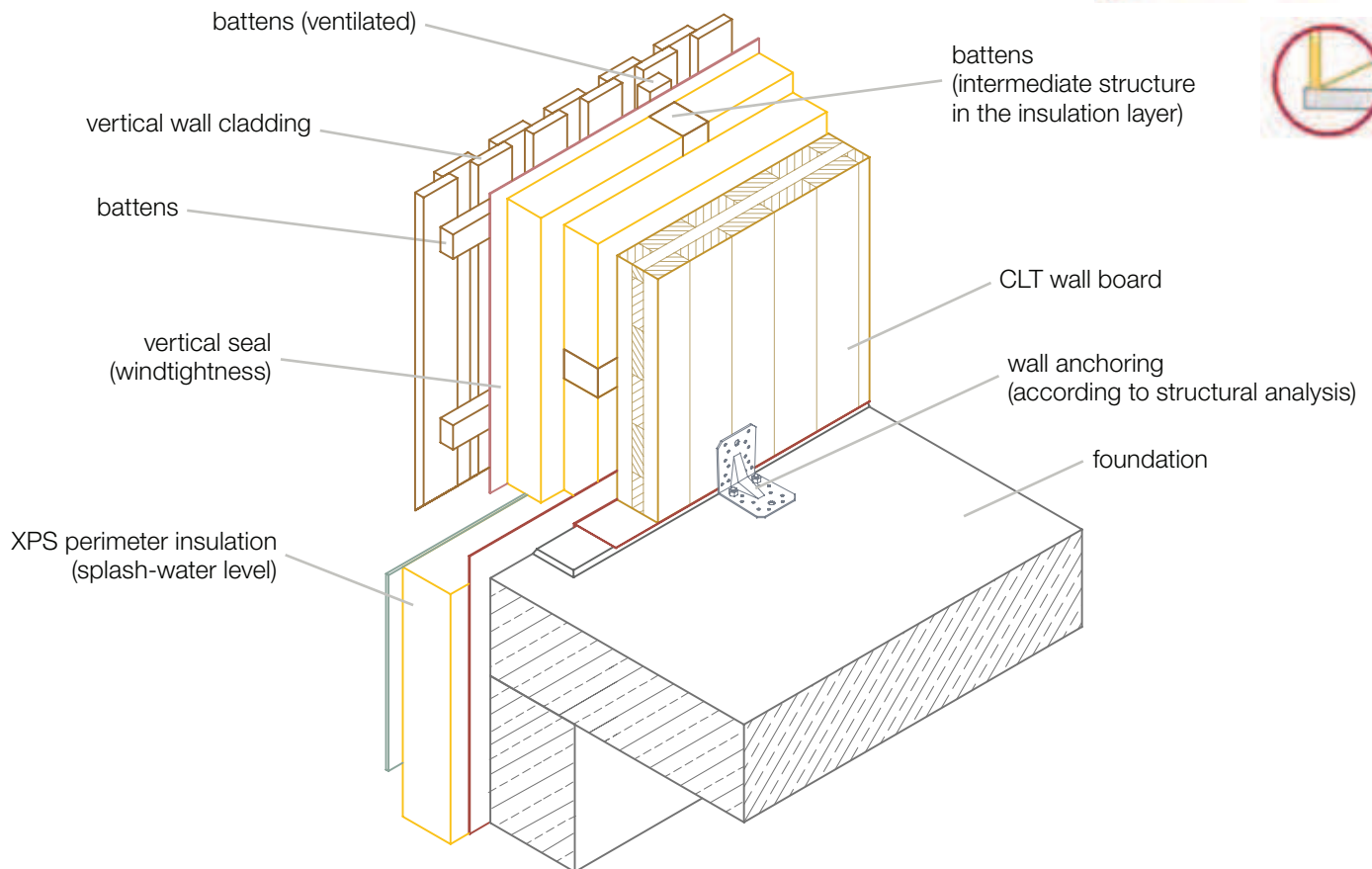
## **D Other applications**

- Industrial and commercial buildings
- Multi-storey residential buildings
- Building extensions
- Structural engineering

**Constructions or structures must be tested separately and calculated on a case by case basis with regard to the structural analysis, building physics and feasibility. The actual professional implementation is the responsibility of the crews authorised to perform the work.**

## 1 Base and wall anchoring

### 1.1 Base with ventilated façade

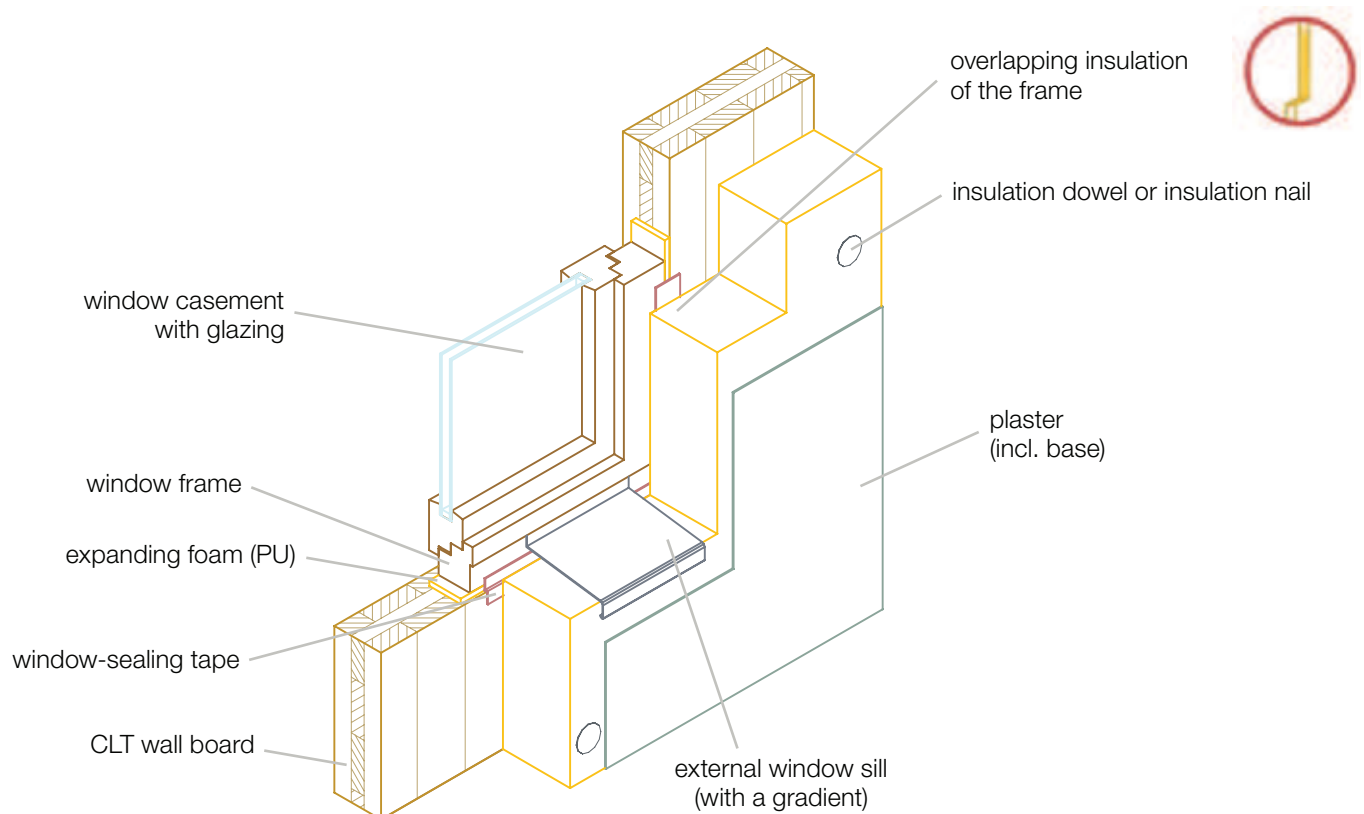


#### Execution

- Full surface contact of the CLT wall board must be ensured by means of a mortar bed.
- The perimeter insulation up to splash-water level must be executed properly according to the cladding material and the projection of the roof.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- When fitting the wall anchoring (tensile and shear forces), the permissible edge distances for the connectors must be observed.

## 2 Window connection

### 2.1 Installation with expanding foam



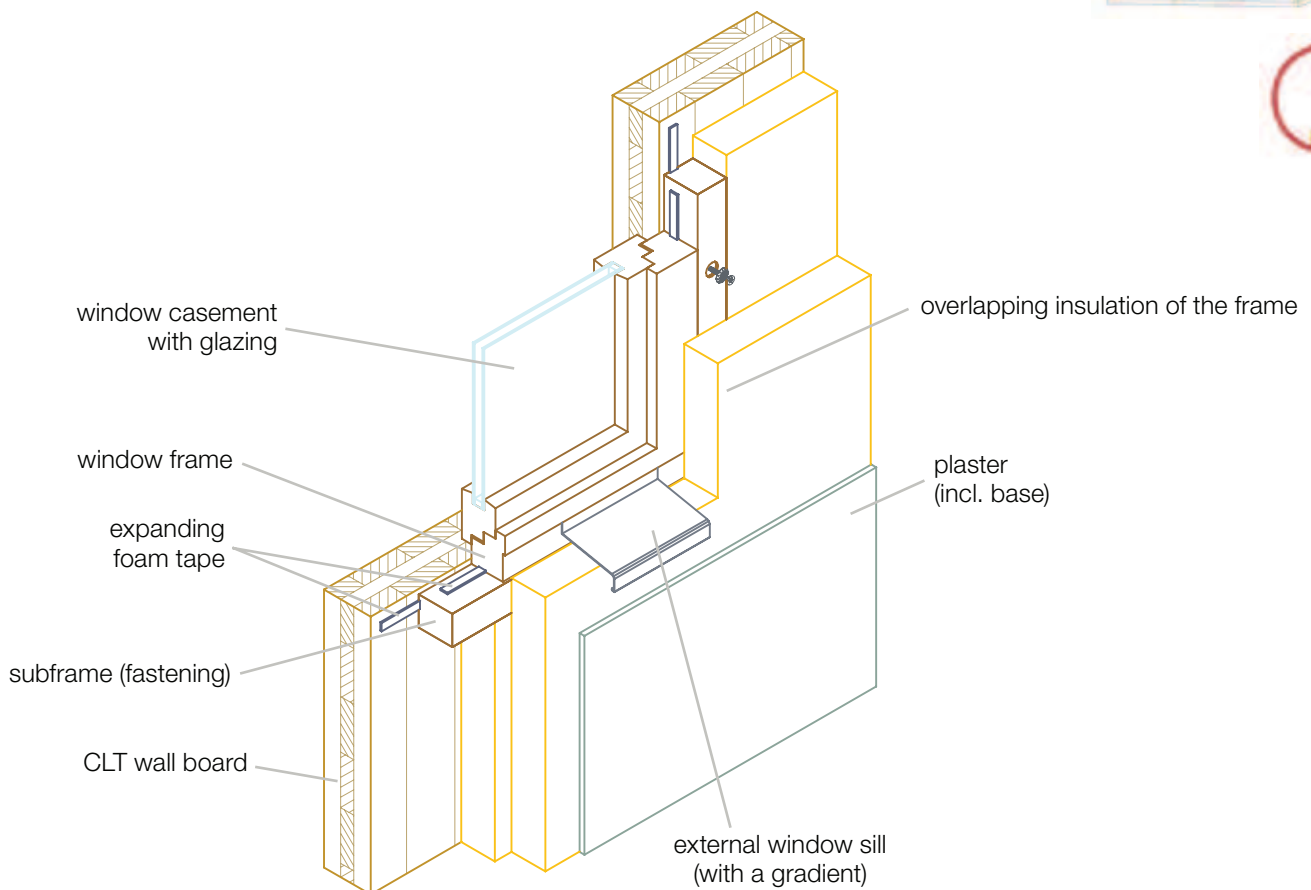
#### Execution

- Connection of the external window sill to the reveal (weak spot): with wooden façades an additional insulation layer must be installed under the window sill and vertically bonded at the side. If the façade is plastered, special measures must be taken at the end cap of the window sill. The connection between the end cap and window sill must be sealed with butyl tape and the connection between the end cap and the plaster with sufficiently thick sealing tape (because of the expansion properties of the external window sill).
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Mechanical anchoring of the windows according to manufacturer's instructions and structural requirements.

Illustration

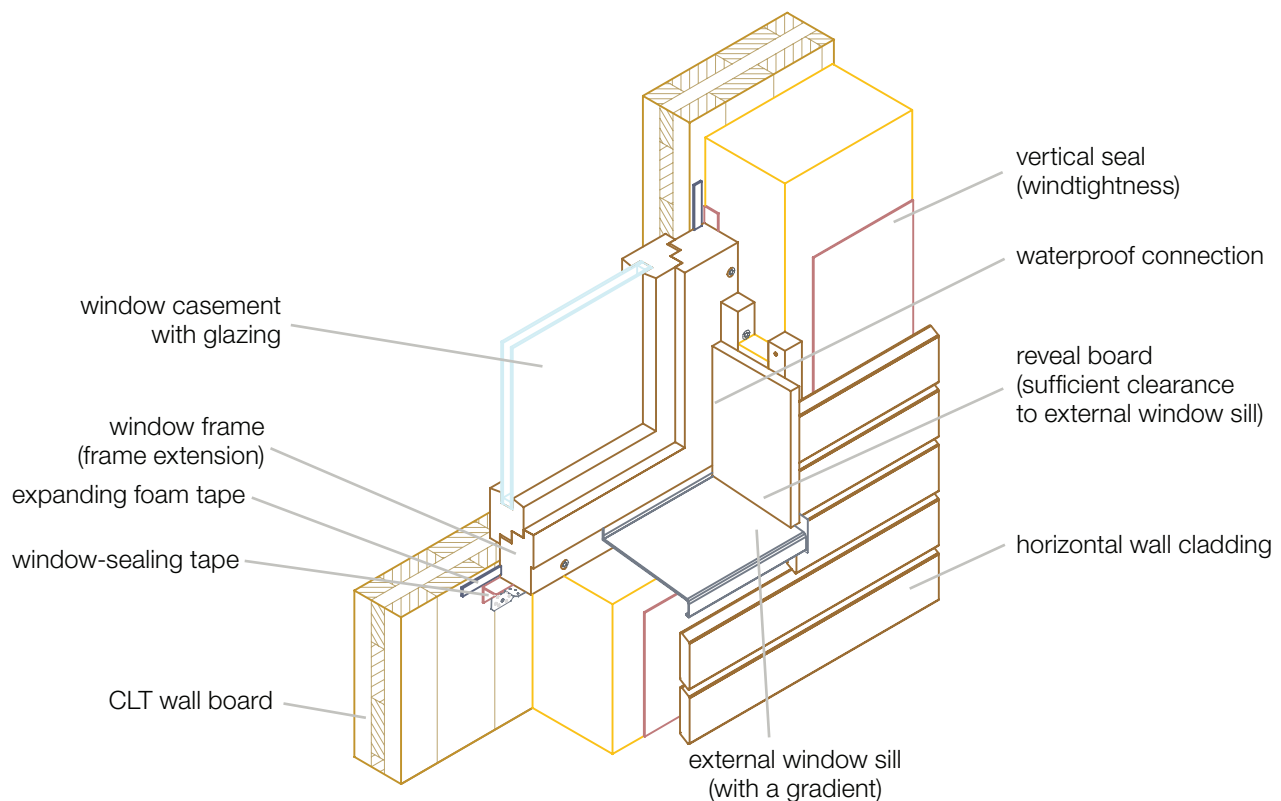


## 2.2 Installation with expanding foam tape



### Execution

- Connection of the external window sill to the reveal (weak spot): with wooden façades an additional insulation layer must be installed under the window sill and vertically bonded at the side. If the façade is plastered, special measures must be taken at the end cap of the window sill. The connection between the end cap and window sill must be sealed with butyl tape and the connection between the end cap and the plaster with sufficiently thick sealing tape (because of the expansion properties of the external window sill).
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Mechanical anchoring of the windows according to manufacturer's instructions and structural requirements.



## Execution

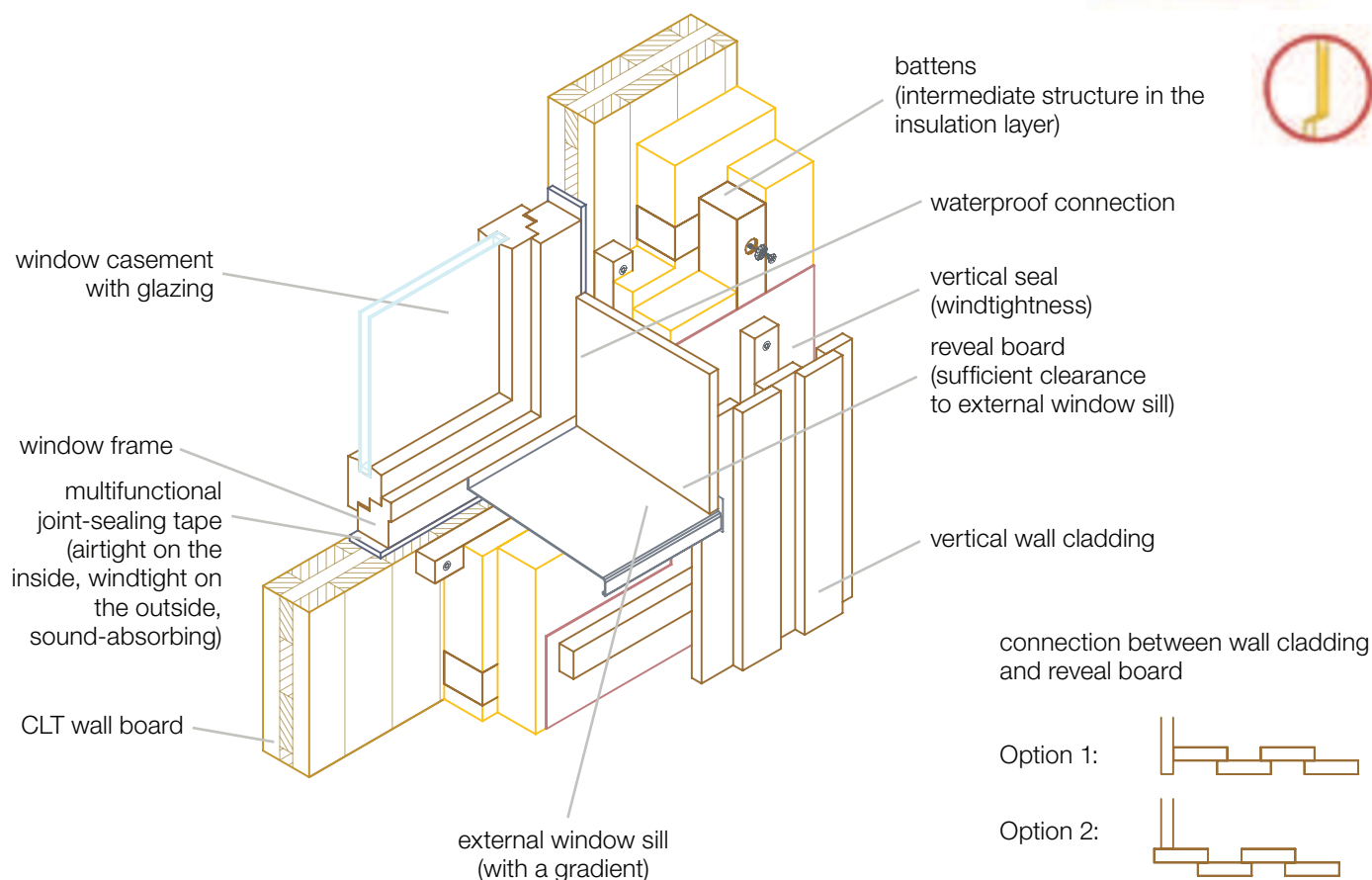
- Connection of the external window sill to the reveal (weak spot): with wooden façades an additional insulation layer must be installed under the window sill and vertically bonded at the side. If the façade is plastered, special measures must be taken at the end cap of the window sill. The connection between the end cap and window sill must be sealed with butyl tape and the connection between the end cap and the plaster with sufficiently thick sealing tape (because of the expansion properties of the external window sill).
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Mechanical anchoring of the windows according to manufacturer's instructions and structural requirements.
- The connection between the window-sealing tape and the windtight insulation layer must be executed according to the manufacturer's specifications or current standards.

Illustration





## 2.3 Installation with multifunctional joint-sealing tape

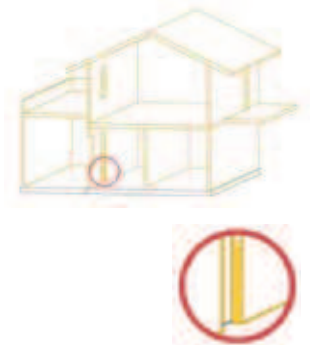
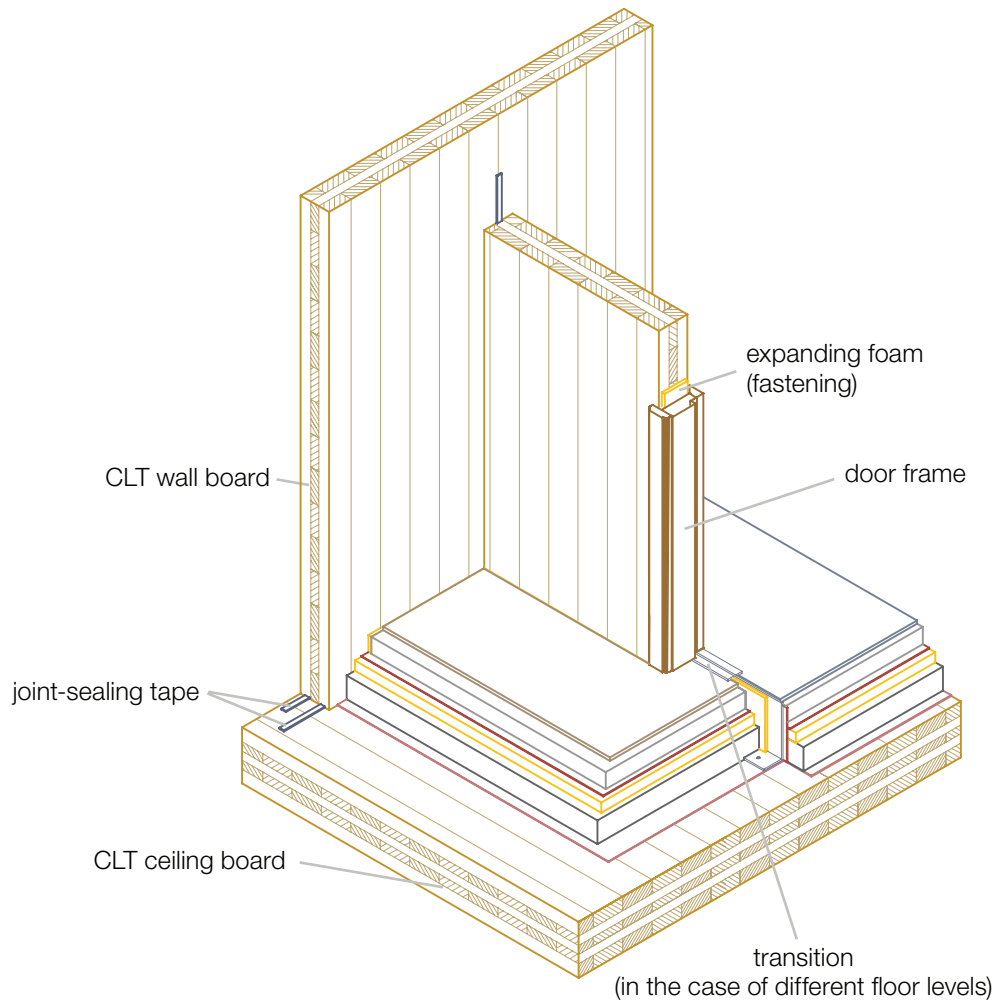


### Execution

- Connection of the external window sill to the reveal (weak spot): with wooden façades an additional insulation layer must be installed under the window sill and vertically bonded at the side. If the façade is plastered, special measures must be taken at the end cap of the window sill. The connection between the end cap and window sill must be sealed with butyl tape and the connection between the end cap and the plaster with sufficiently thick sealing tape (because of the expansion properties of the external window sill).
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Mechanical anchoring of the windows according to manufacturer's instructions and structural requirements.
- The connection between the window-sealing tape and the windtight insulation layer must be executed according to the manufacturer's specifications or current standards.

## 3 Door connection

### 3.1 Internal door



#### Execution

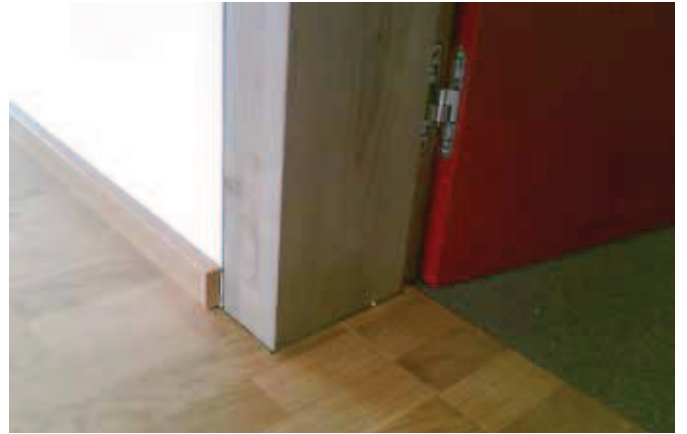
- A suitable transition must be provided in the door area which takes account of the floor structure of the adjacent rooms. The transition between different floors can be achieved by fitting a transition strip or a Schlüter threshold strip.
- The choice and rating of the connectors and all structural components depend on the structural requirements.

# Construction

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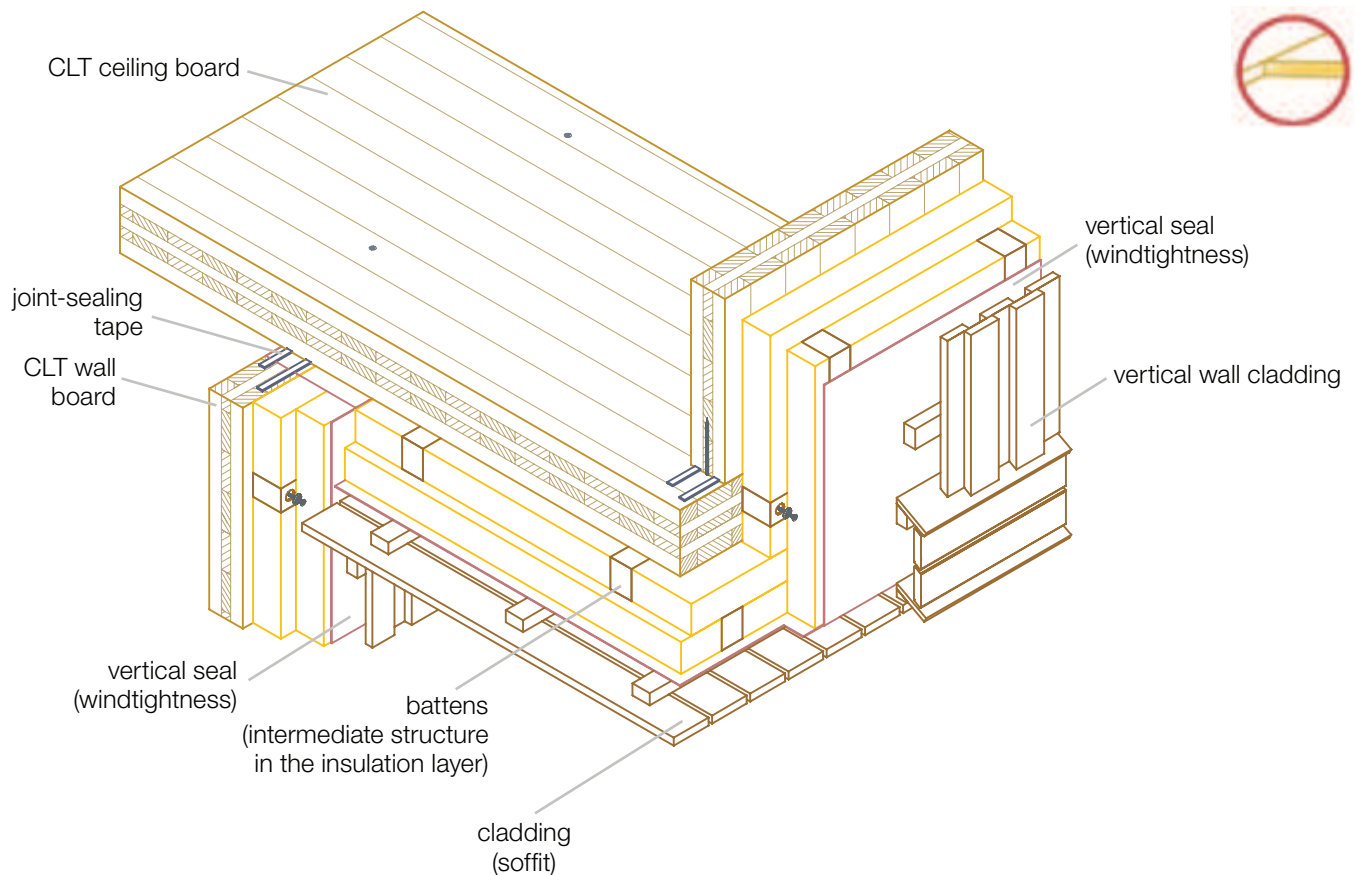
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Illustration



## 4 Cantilever

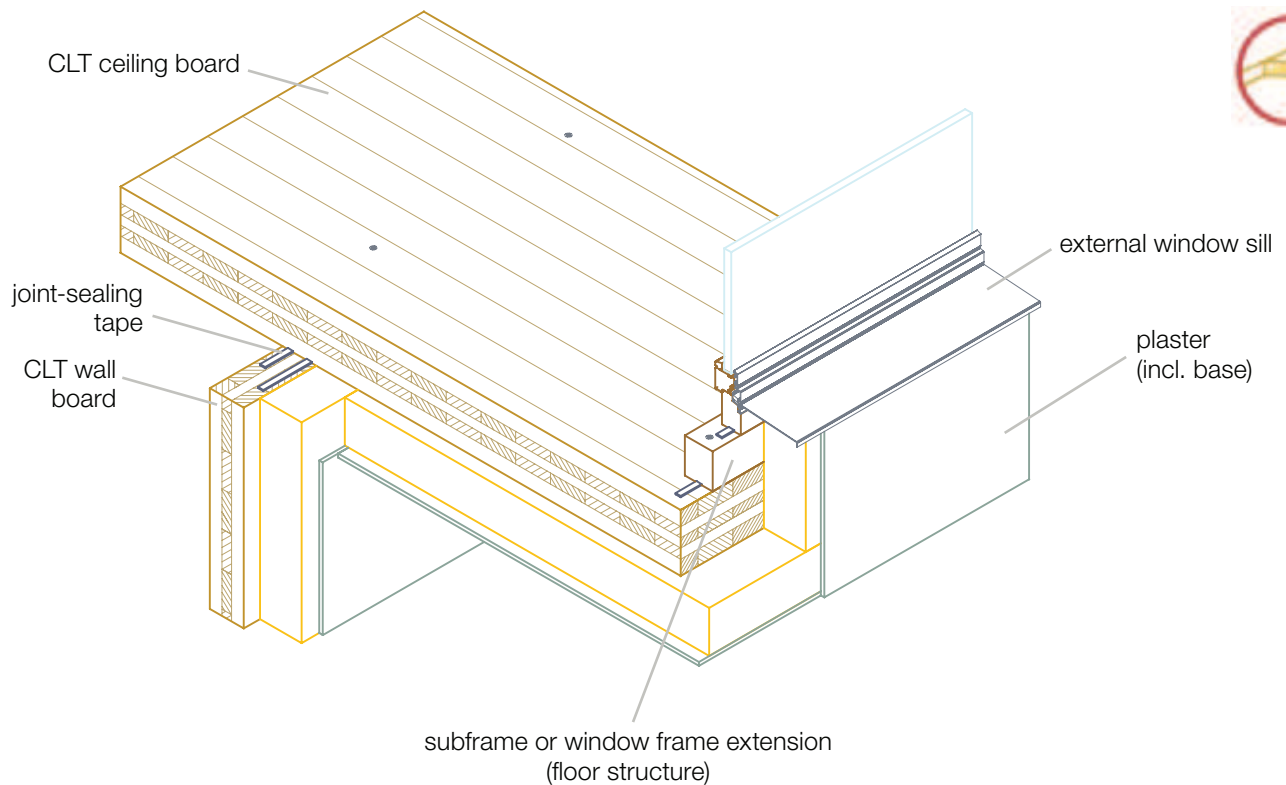
### 4.1 Cantilever with wooden façade



#### Execution

- Joint-sealing tape must be used to make the structure airtight.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- The projecting ceiling must be suspended with fully threaded screws (sized according to structural analysis).

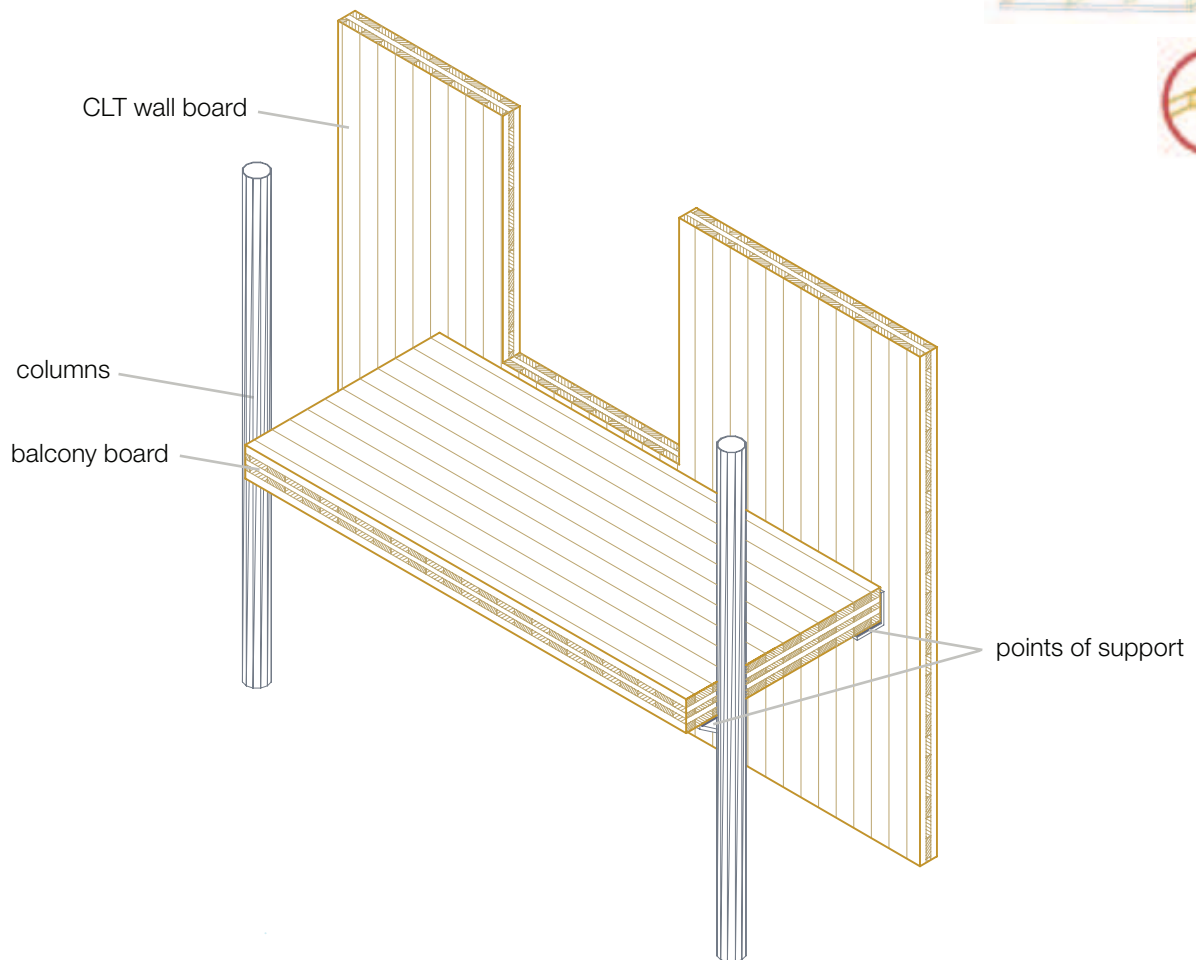
## 4.2 Cantilever with plastered façade



### Execution

- Joint-sealing tape must be used to make the structure airtight.
- The height of the subframe or the window frame extension depends on the floor structure.
- The choice and rating of the connectors and all structural components depend on the structural requirements.

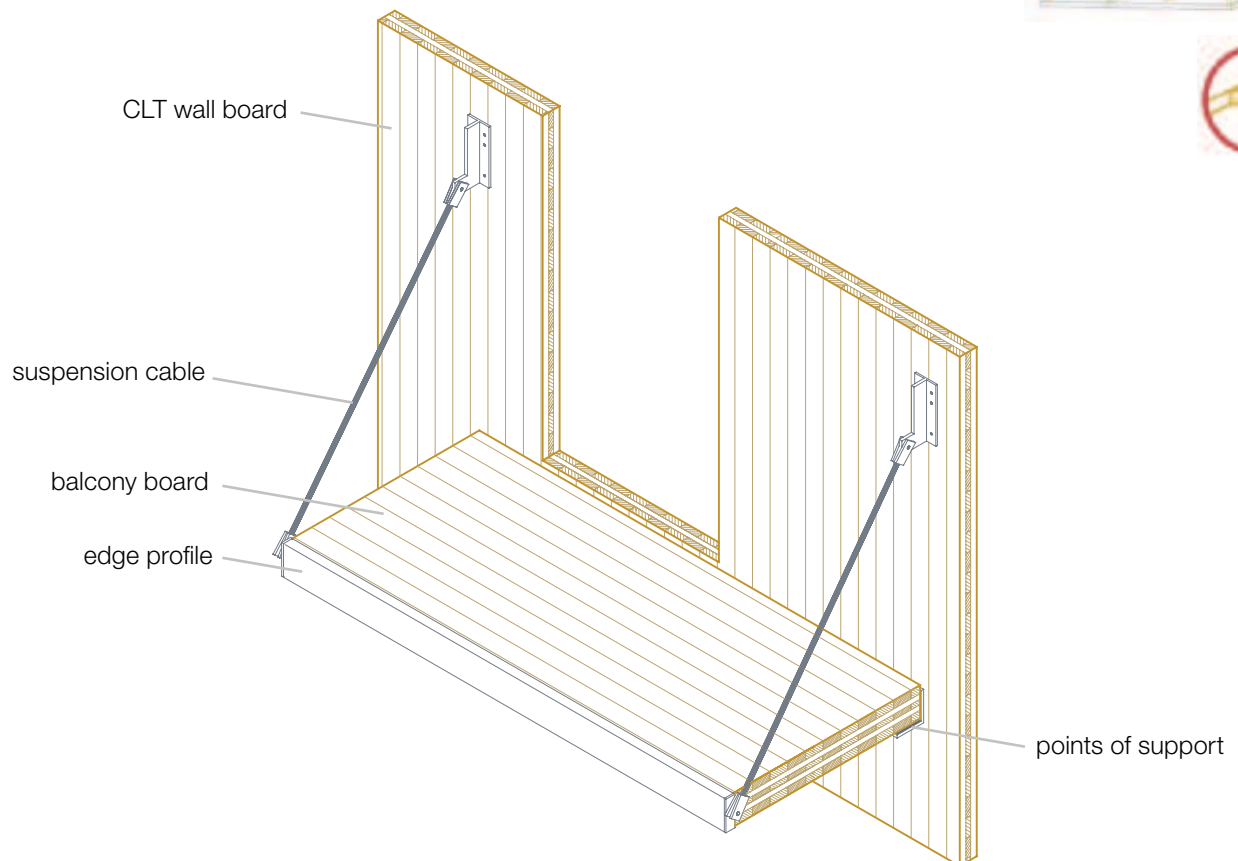
## 4.3 Balcony board (supported)



### Execution

- Unlike cantilever ceiling boards, projecting balcony boards prevent the formation of thermal bridges.
- If a continuous insulation layer is required, the support brackets must be mounted on spacer blocks (of the same thickness as the insulation).
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- The dimensions of the balcony board depend on the structural requirements.

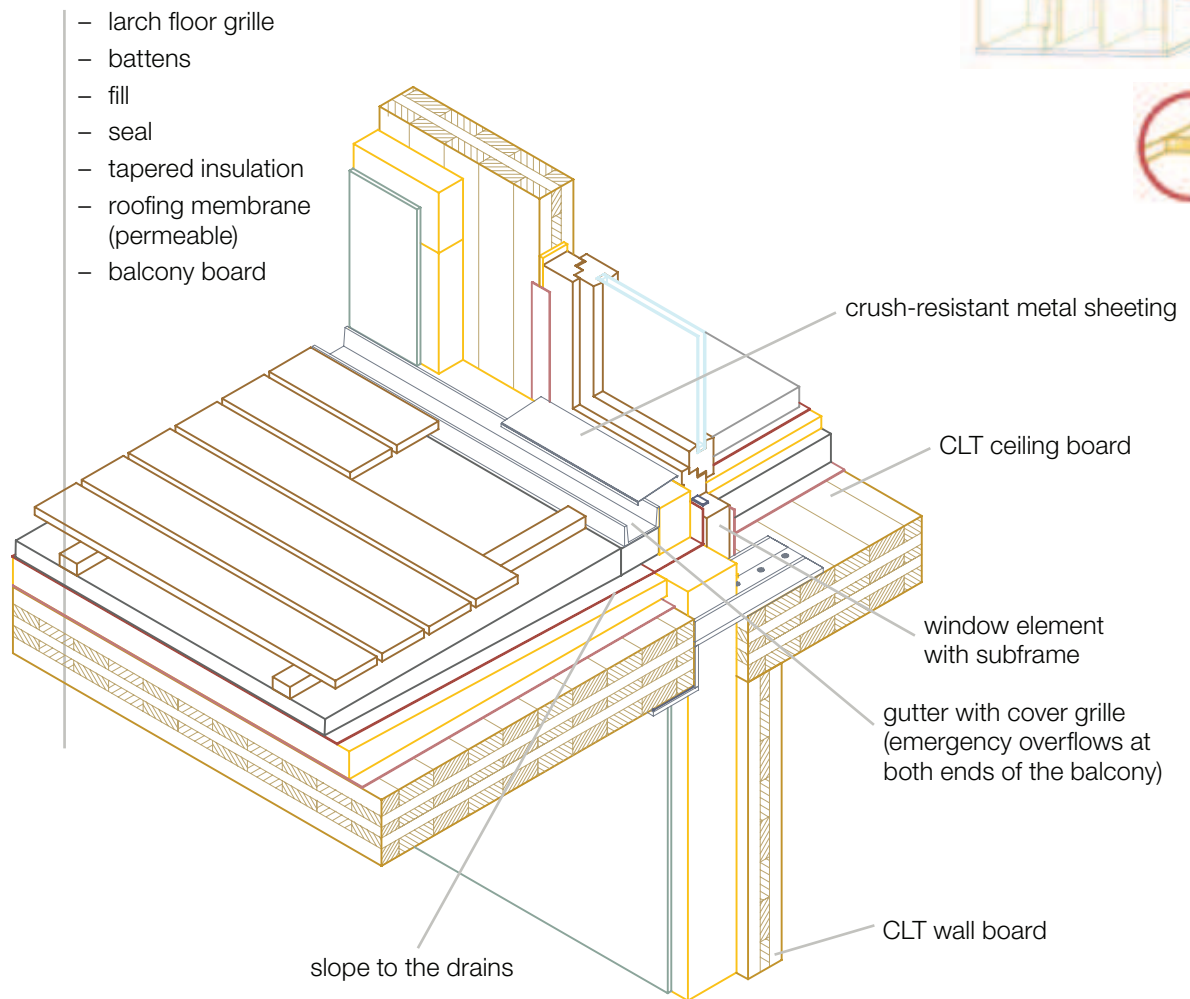
## 4.4 Balcony board (suspended)



### Execution

- Unlike cantilever ceiling boards, projecting balcony boards prevent the formation of thermal bridges.
- If a continuous insulation layer is required, the support brackets must be mounted on spacer blocks (of the same thickness as the insulation).
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- The dimensions of the balcony board depend on the structural requirements.
- Please note the risk of the wall buckling.

## 4.5 Balcony (timber planking on tapered insulation)



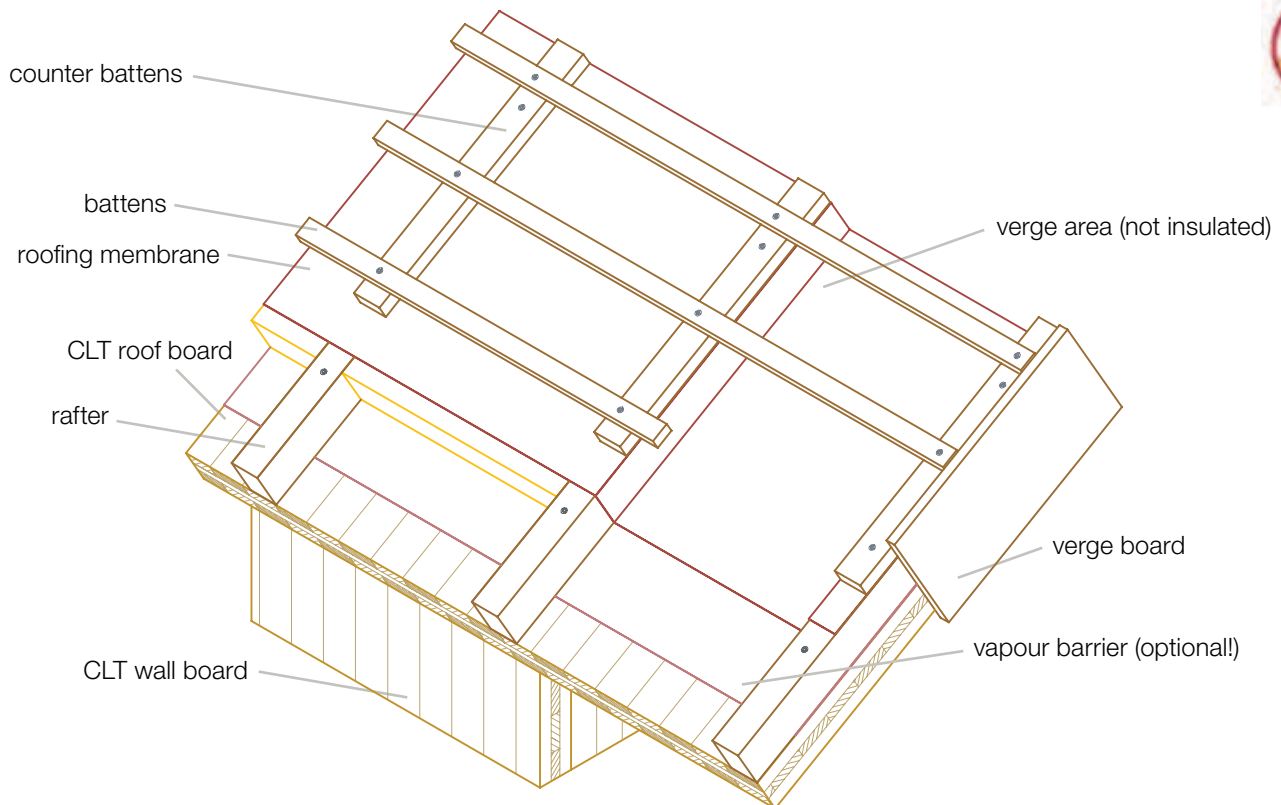
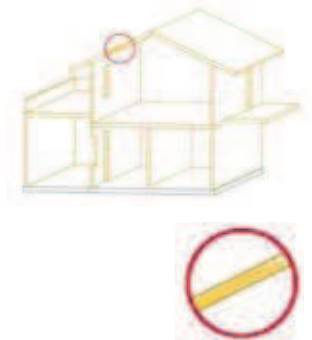
### Execution

- Water is directed down the tapered insulation into drains.
- There is a gutter with emergency outflows at both ends for excess water.
- Protection against splash water appropriate to the degree of cover of the balcony must be provided.
- The choice and rating of the connectors and all structural components depend on the structural requirements.



## 5 Steep roof

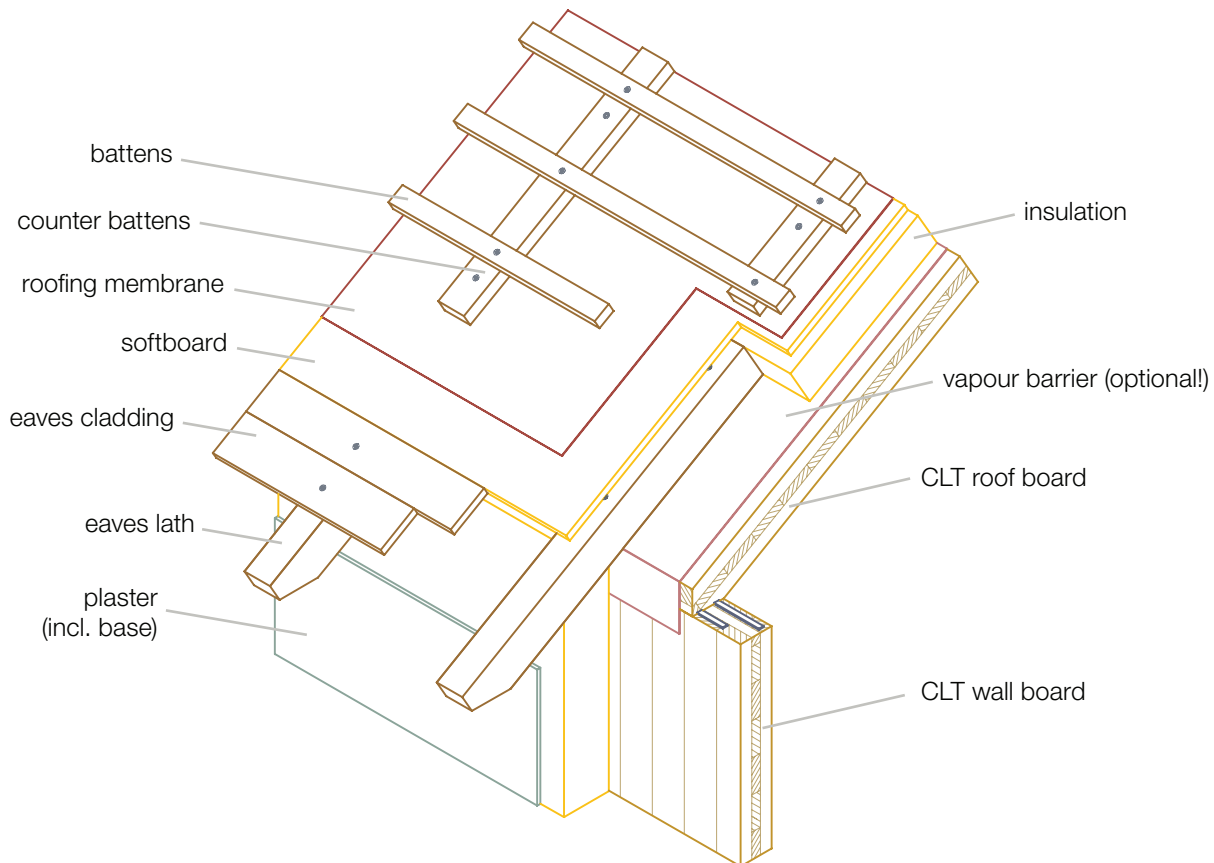
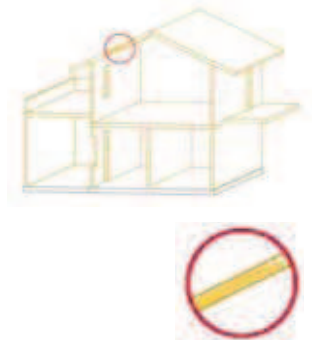
### 5.1 Wall-to-roof connection (CLT roof projection)



#### Execution

- The projecting CLT roof board forms the soffit.
- The verge area beyond the gable wall does not need to be insulated.
- The verge board can remain visible or be covered with metal sheeting, as required.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- When sizing the CLT roof board, attention must be paid to the lateral projection.

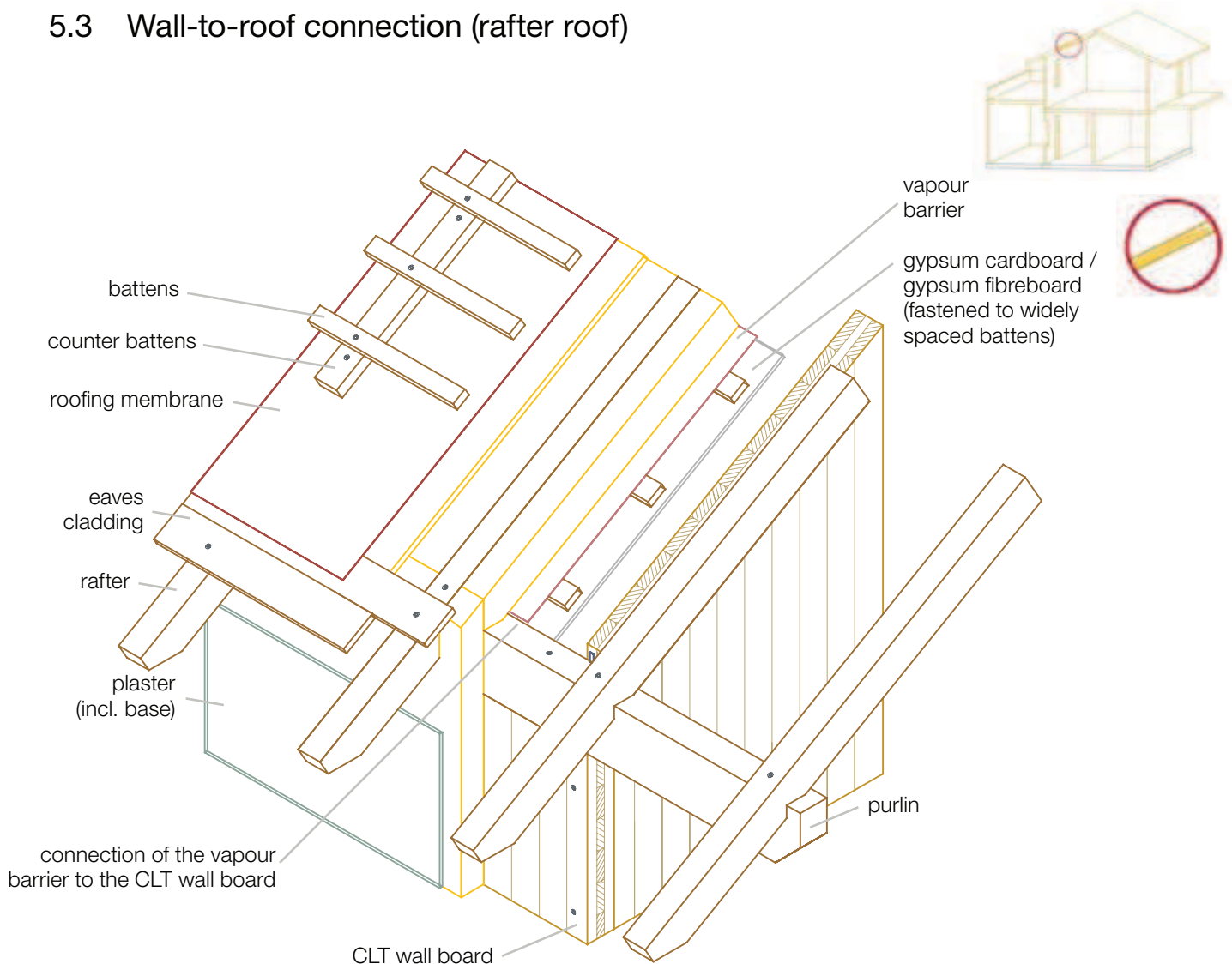
## 5.2 Wall-to-roof connection (eaves laths)



### Execution

- The roof overhang is constructed with eaves laths (secured against suction forces as per structural analysis) and eaves cladding.
- The softboard insulation over the rafters must be of the same thickness as the eaves cladding to avoid forming a rebate in the rafter projection.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- The counter battens must be fastened according to the pressure resistance of the insulation.

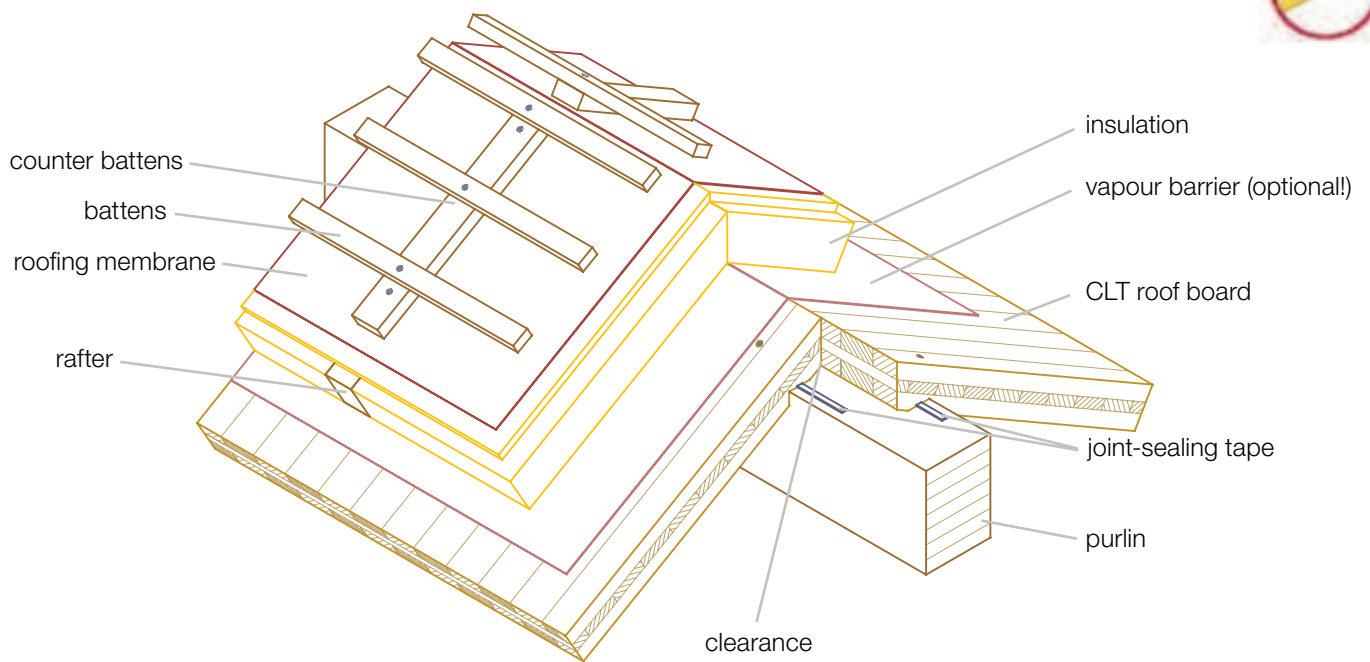
## 5.3 Wall-to-roof connection (rafter roof)



### Execution

- The roof overhang is constructed with rafters (secured against suction forces as per structural analysis) and eaves cladding.
- The softboard insulation over the rafters must be of the same thickness as the eaves cladding to avoid forming a rebate in the rafter projection.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- The connection between the vapour barrier and CLT wall board must be airtight.

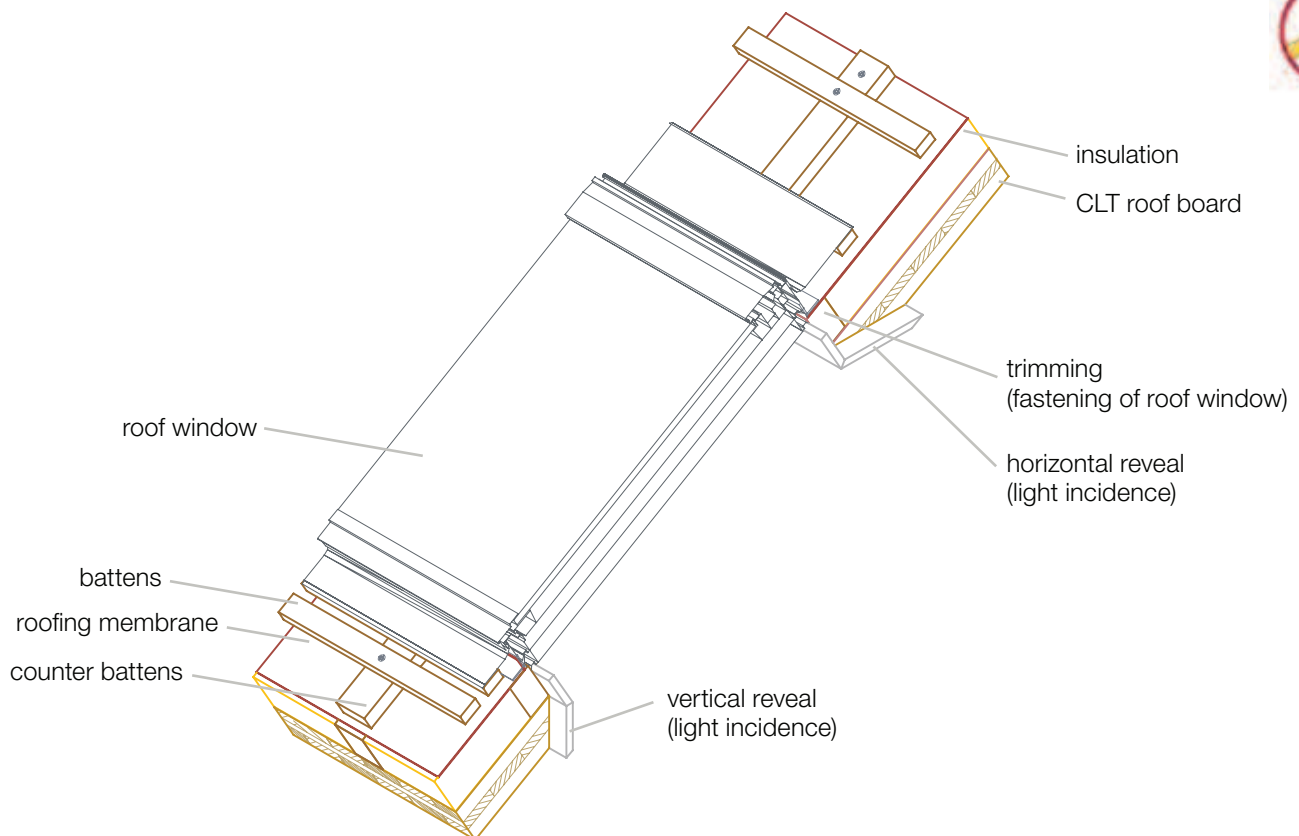
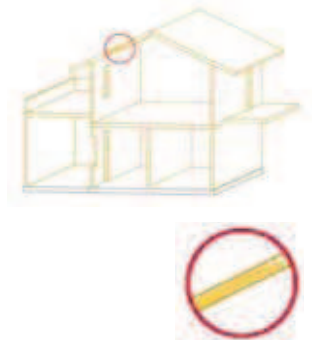
## 5.4 Ridge (with purlin)



### Execution

- If the roof structure is suitably designed and the layers are configured in the right order (with their permeability increasing from inside to outside), a vapour barrier may be omitted.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Joint-sealing tape must be used to make the structure airtight.

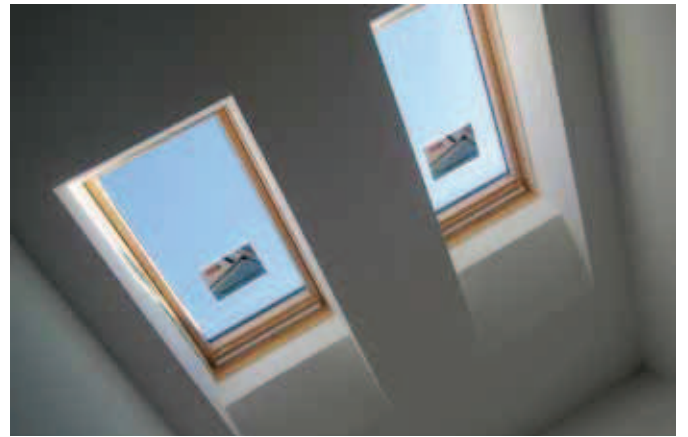
## 5.5 Roof window



### Execution

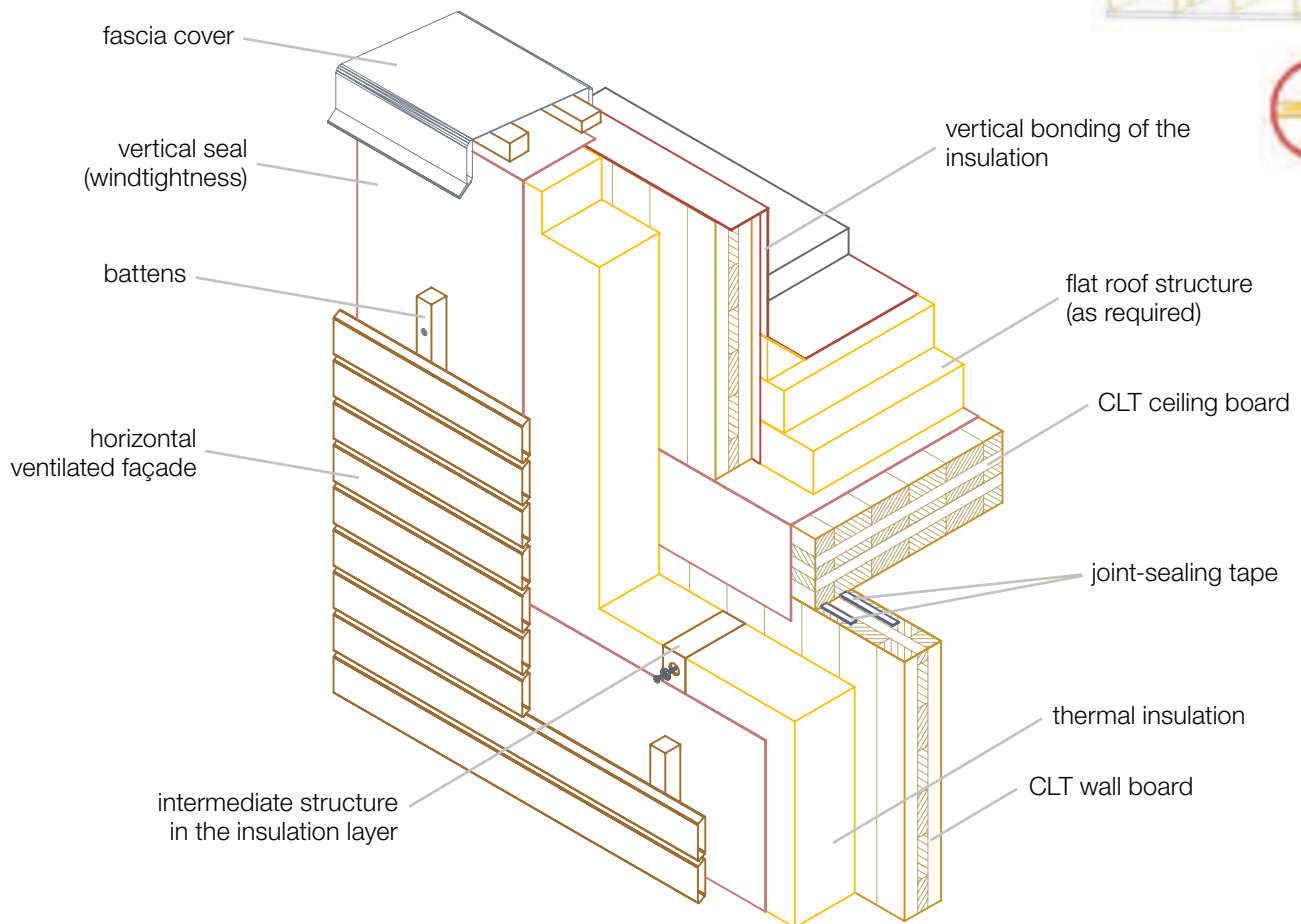
- There must be a close connection between the roof window and the roofing membrane when fitting the window.
- The design of the inner reveals depends on the level of light incidence required.
- Reveal material: plasterboard or derived timber board.
- The choice and rating of the connectors and all structural components depend on the structural requirements.

Illustration



## 6 Flat roof

### 6.1 CLT fascia structure



#### Execution

- Flat roof insulation with a gradient.
- Anchor the fascia wall to the CLT roof board (as per structural analysis).
- The choice and rating of the connectors and all structural components depend on the structural requirements.

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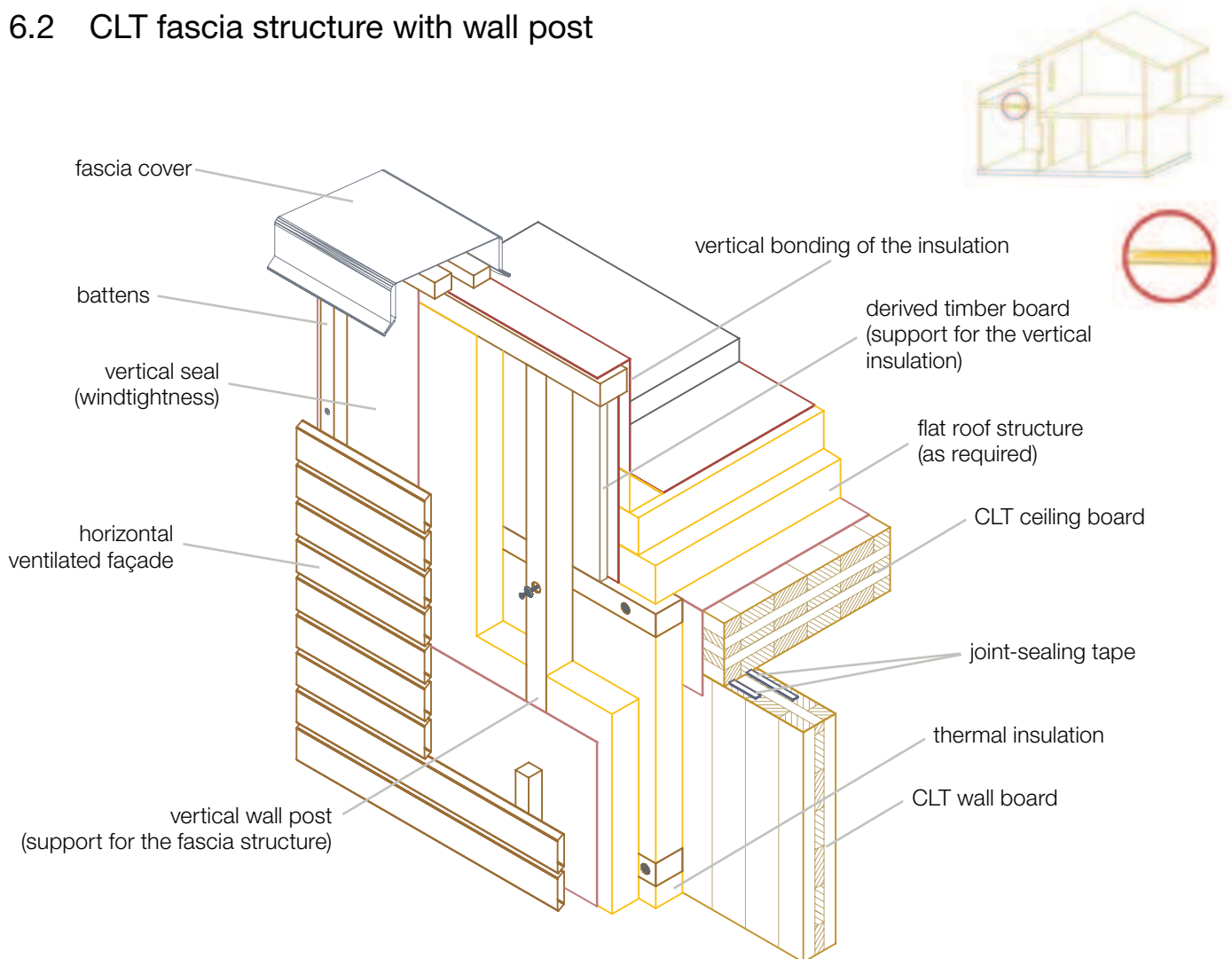
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Illustration





## 6.2 CLT fascia structure with wall post



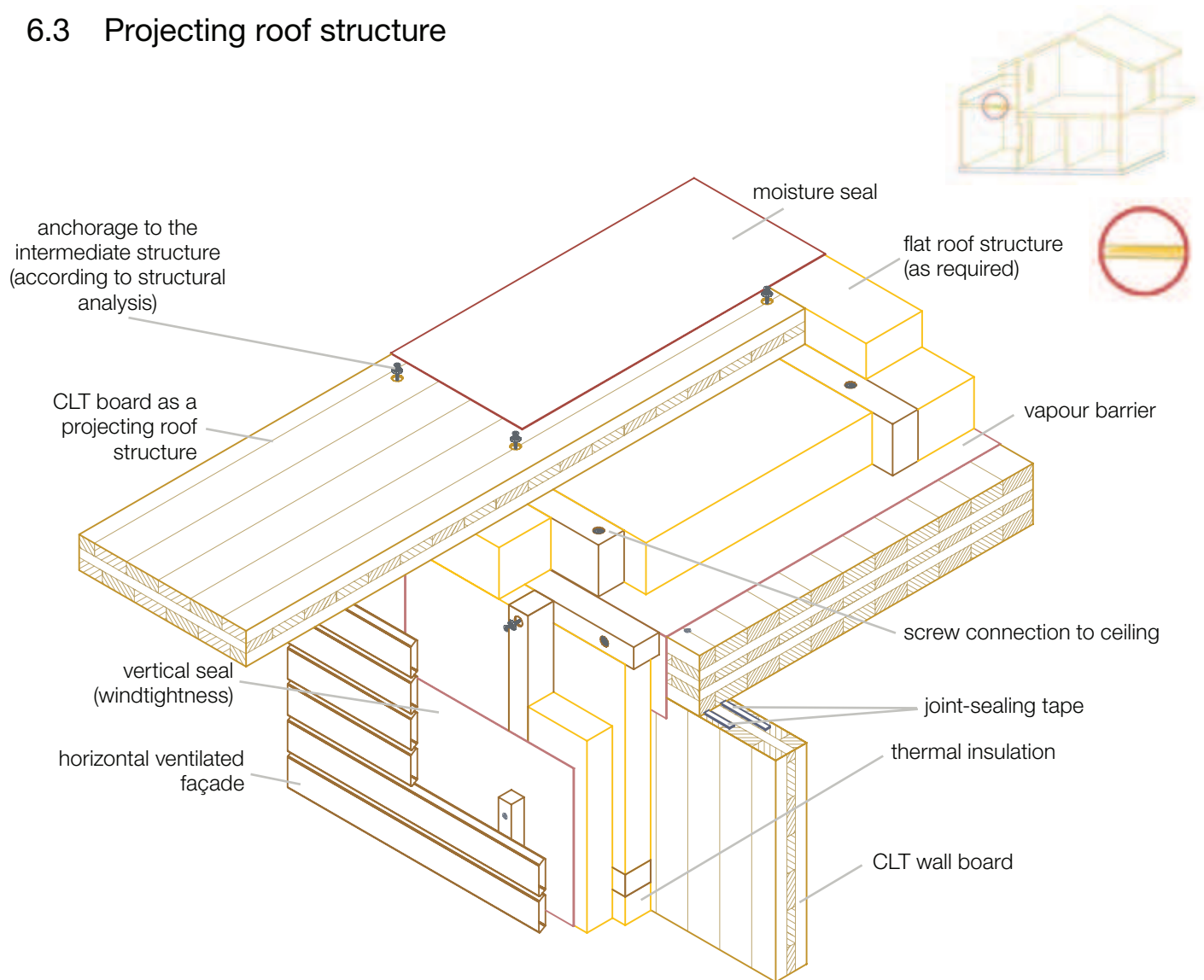
### Execution

- Flat roof insulation with a gradient.
- Vertical wall posts assume a structural function in the fascia (dimensions and fastening as per structural analysis).
- The choice and rating of the connectors and all structural components depend on the structural requirements.

## Illustration



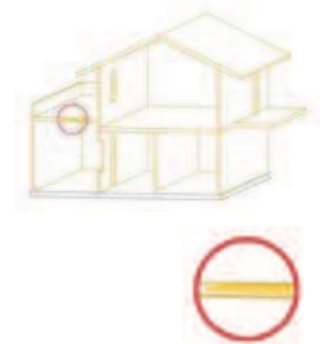
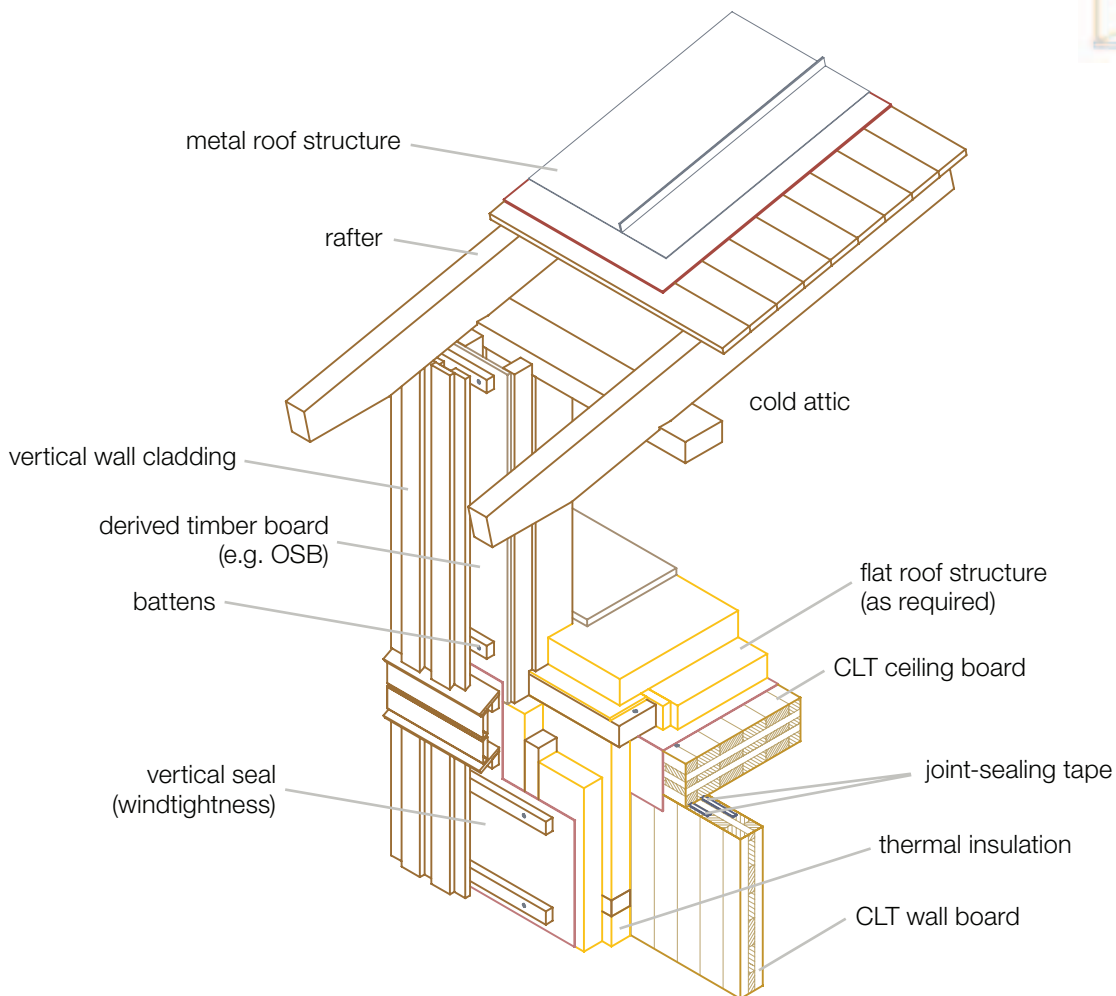
## 6.3 Projecting roof structure



### Execution

- The soffit of the CLT roof overhang can remain visible or be covered with metal sheeting, as required.
- The edging must be executed according to the slope of the roof.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- The CLT projection must be dimensioned according to the roof overhang (caution with a lateral projection).

## 6.4 Flat roof connection (with a cold attic above)

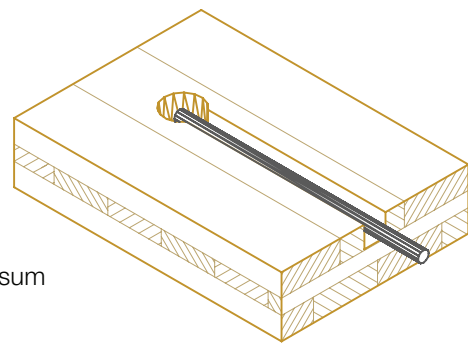
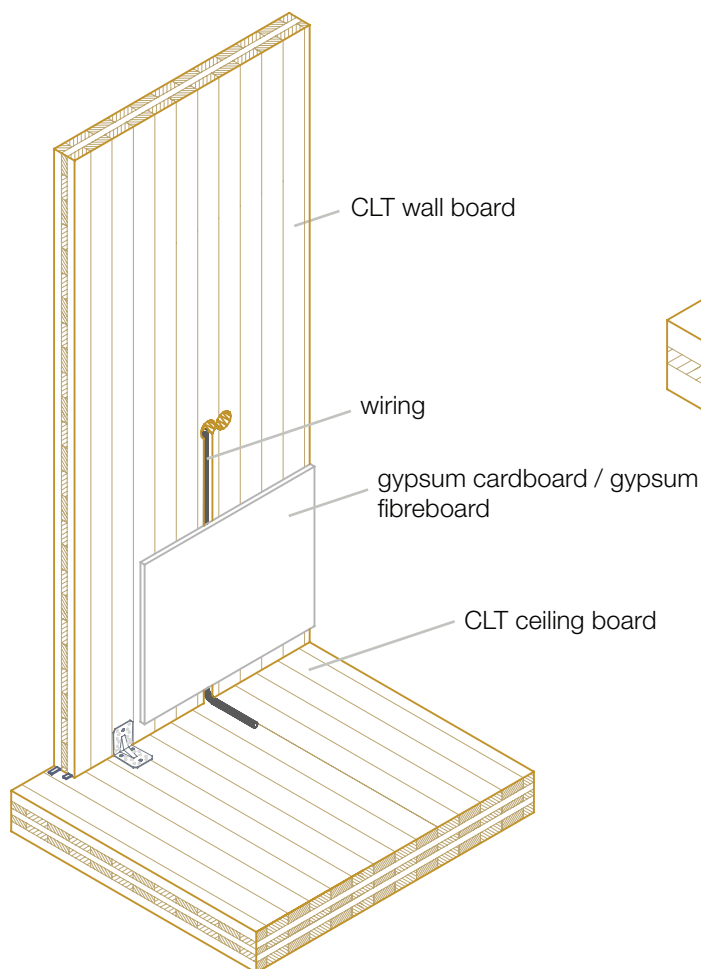


### Execution

- The load transfer from the roof structure to the CLT roof and wall boards must be taken into account.
- The choice and rating of the connectors and all structural components depend on the structural requirements.

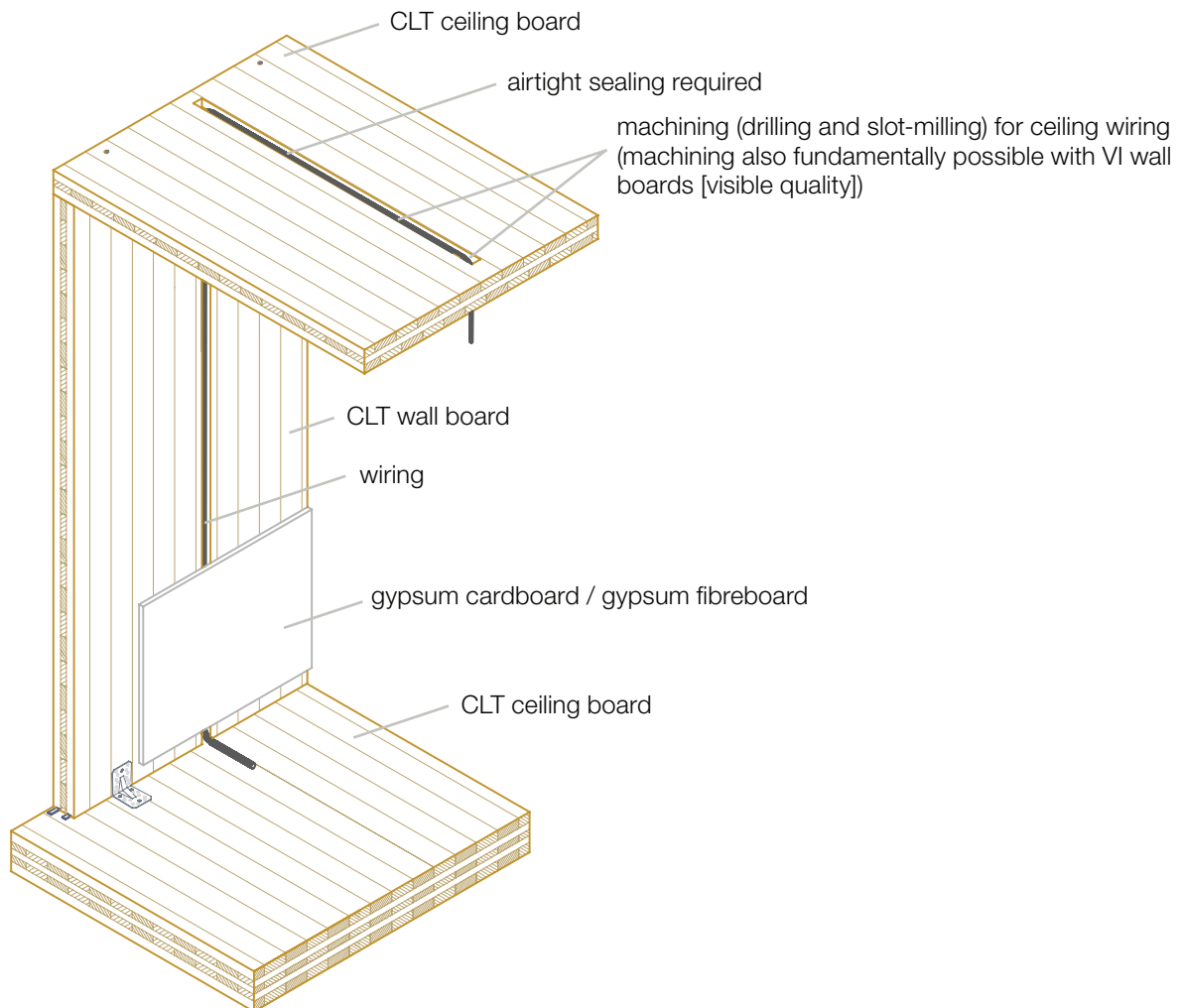
## 7 Electrical installations

### 7.1 Execution before wall cladding



#### Execution

- Finish for NVI boards (non-visible quality).
- Cross milling (at right angles to the top layer) is possible only to a limited extent and must be carried out in accordance with the structural analysis.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Avoid penetrating the airtight layer when routing wiring.



## Execution

- Finish for NVI boards (non-visible quality).
- Machining (slot milling), for example with CLT ceiling boards, is only possible in the direction of the top layer. Transverse layers must remain intact in order not to impair the load capacity.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Avoid penetrating the airtight layer when routing wiring.

# Construction

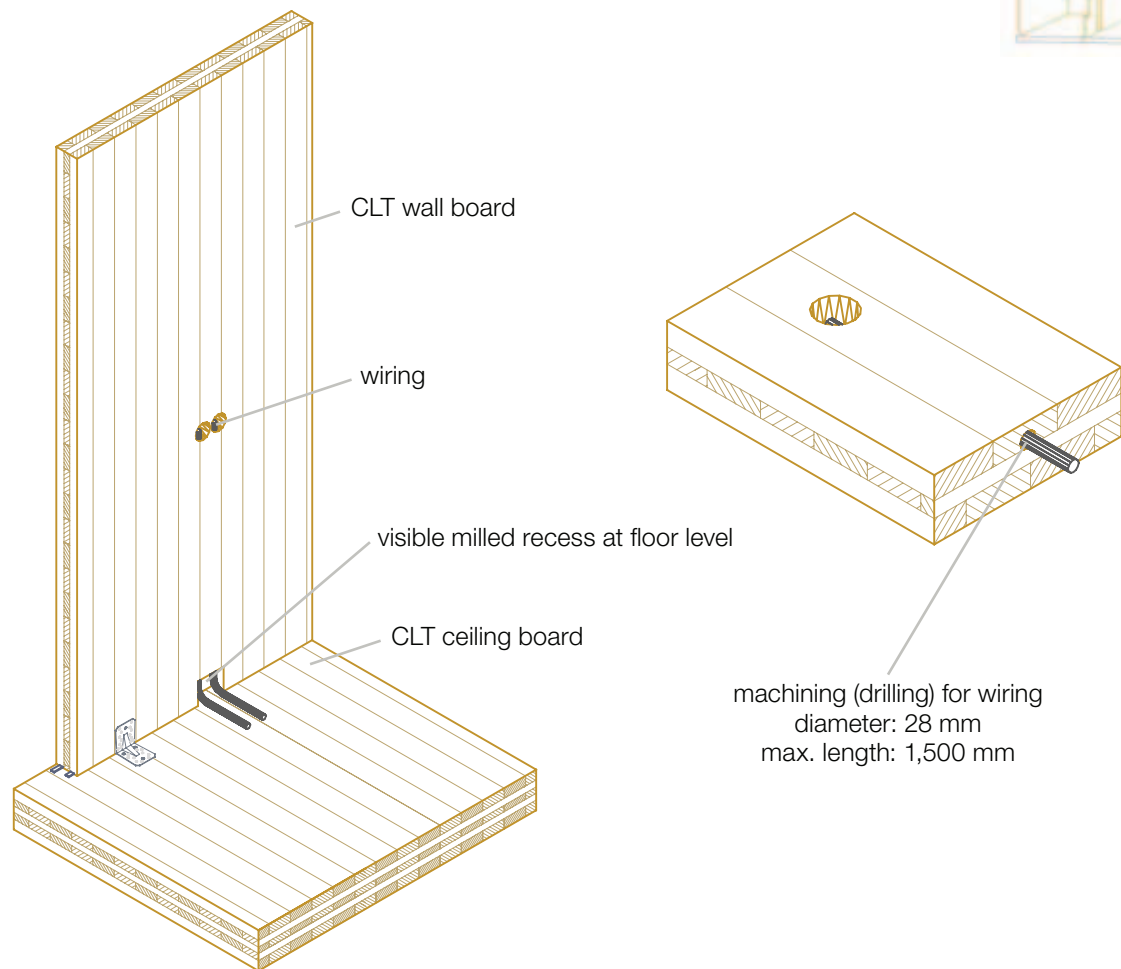
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Illustration



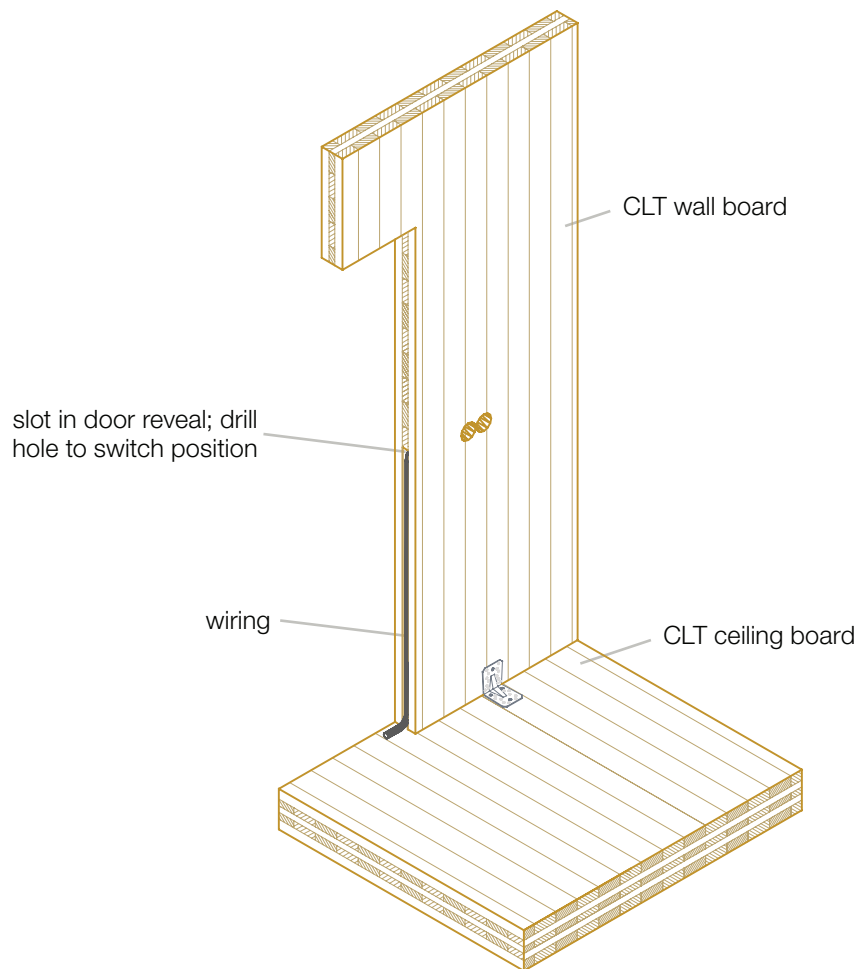
## 7.2 Execution with visible-quality CLT



### Execution

- Finish for VI boards (visible quality).
- Machining (drilling for cables) is only possible from the grain end of the CLT board.
- Adjacent bores must have a minimum centre distance of 50 mm.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Avoid penetrating the airtight layer when routing wiring.





## Execution

- Finish for VI boards (visible quality).
- A slot is milled in the door reveal, later to be covered by the door frame, and a hole is drilled from the reveal to the position of the switch or socket.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Avoid penetrating the airtight layer when routing wiring.

Illustration



## 7.3 Lightning protection



Illustration

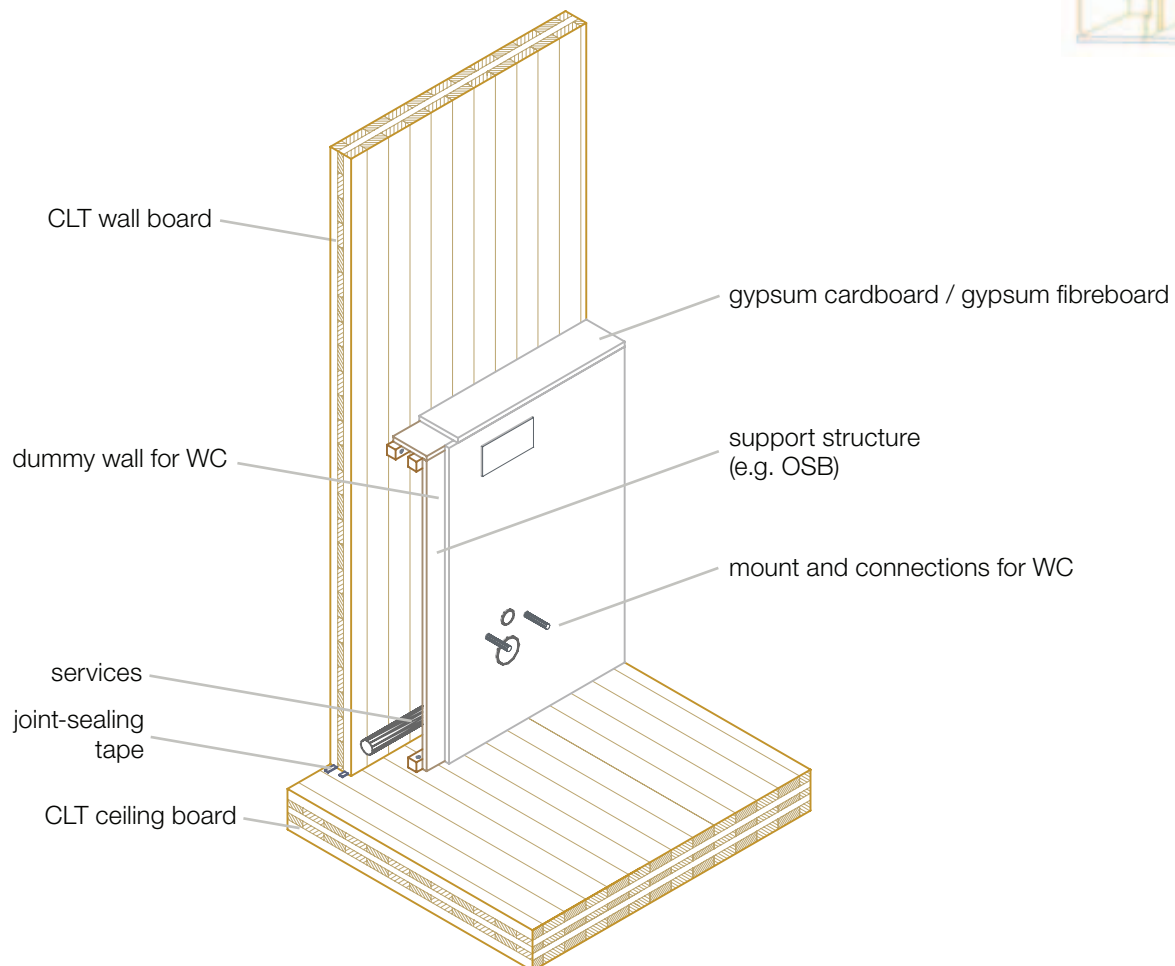


### Execution

- Lightning protection systems protect people and buildings from major damage. The external lightning protection attracts the lightning current and conducts it safely into the ground.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Avoid penetrating the airtight layer when routing wiring.

## 8 Sanitary installations

### 8.1 WC (dummy wall)



#### Execution

- The fastening of the services must be sound-insulated from the other components.
- The support structure of the dummy wall must also be sound-insulated from the ceiling and wall boards.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Avoid penetrating the airtight layer when routing wiring.

# Construction

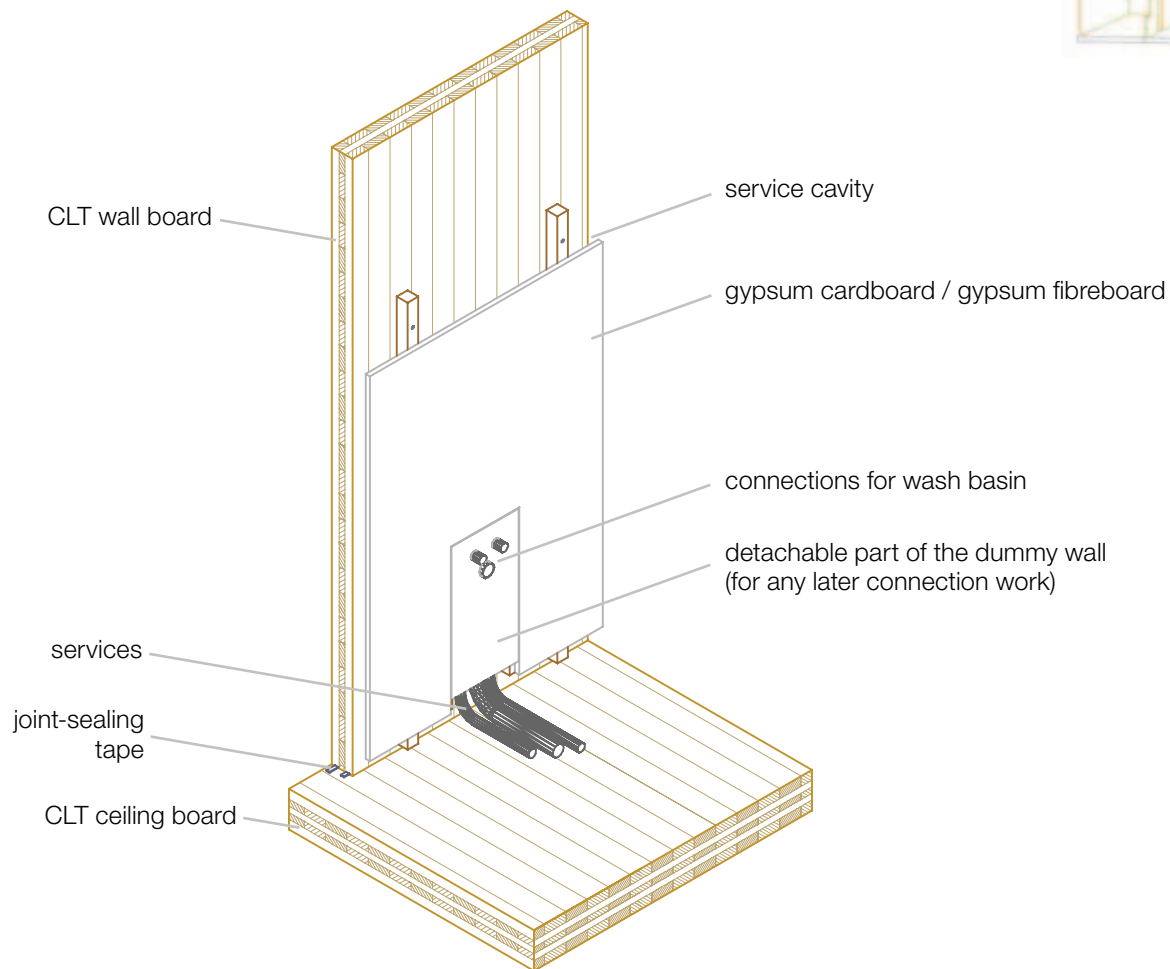
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Illustration



## 8.2 Wash basin (preparation for connection)



### Execution

- The fastening of the services must be sound-insulated from the other components.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- Avoid penetrating the airtight layer when routing wiring.

## 8.3 Sanitary installations — wet room



Illustration

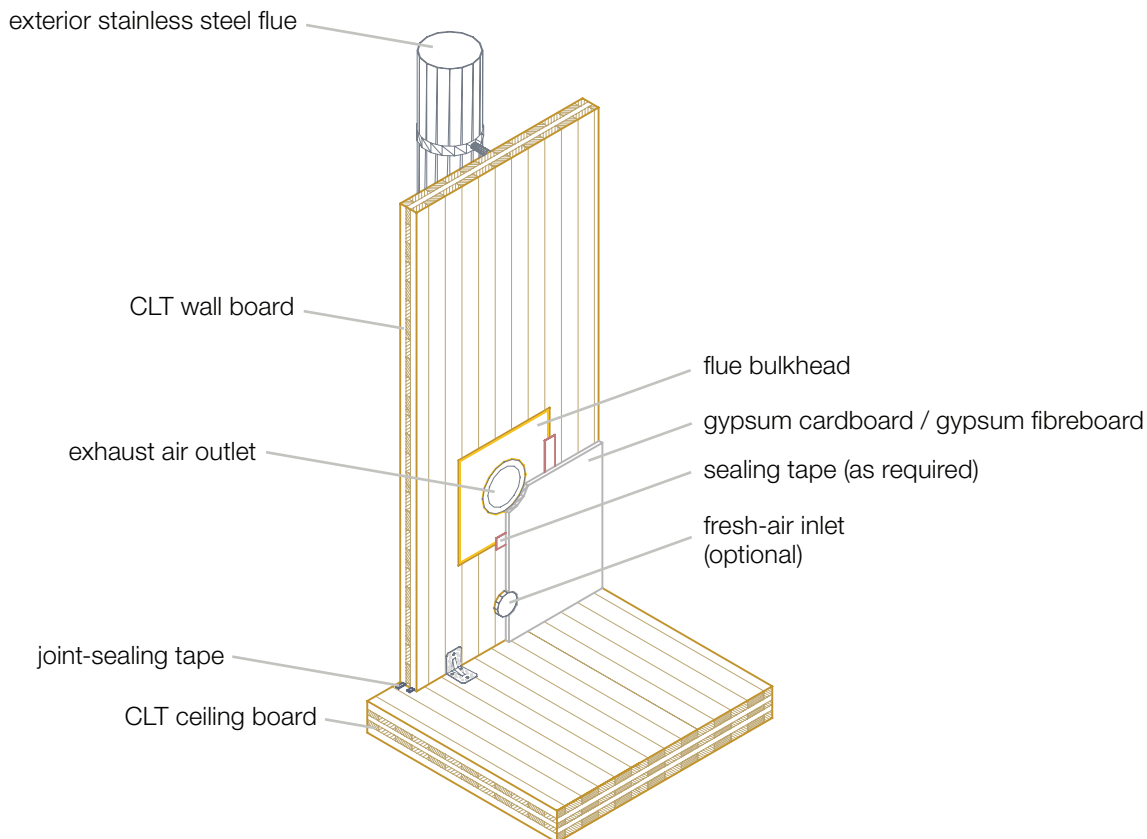


### Execution

- If joints between sanitary installations and other building components are sealed with silicone, they must be checked regularly and renewed, if necessary.
- Tiles must be separated from CLT and plasterboard with an additional insulation layer as tile grouting is not waterproof.
- Avoid penetrating the airtight layer when routing wiring.
- The fastening of the services must be sound-insulated from the other components.

## 9 Flue

### 9.1 Stainless steel flue on the outside of the wall



#### Execution

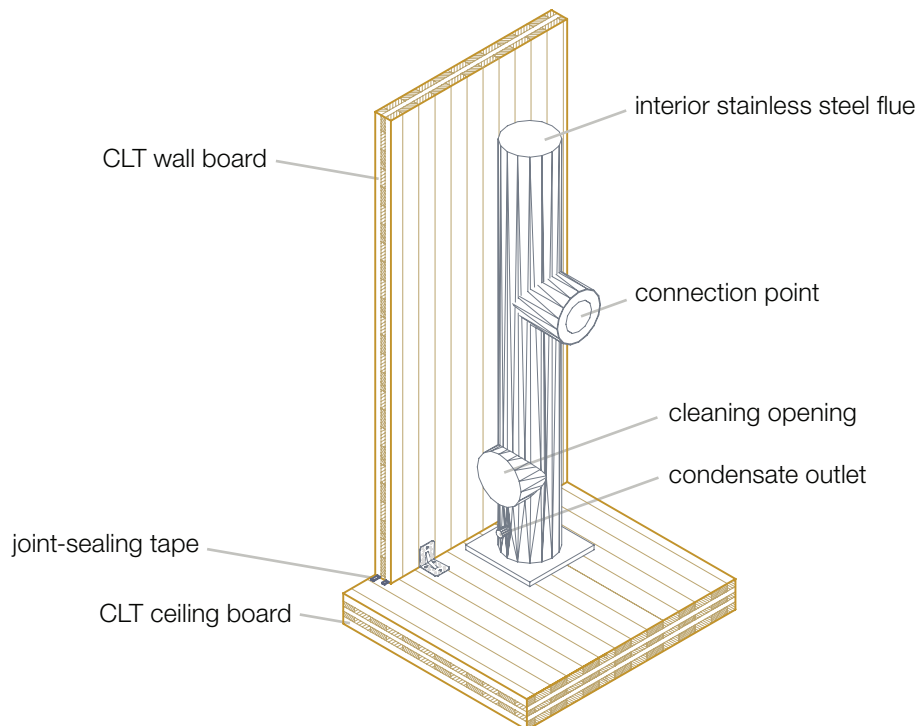
- When using a flue bulkhead, make sure that it is approved for wooden structures.
- Minimum distances to fireplaces and fire protection requirements specified by the manufacturer must be observed.
- The choice and rating of the connectors and all structural components depend on the structural requirements.
- The installation must always be discussed and agreed upon with the authorities and chimney sweep.



Illustration



## 9.2 Interior stainless steel flue



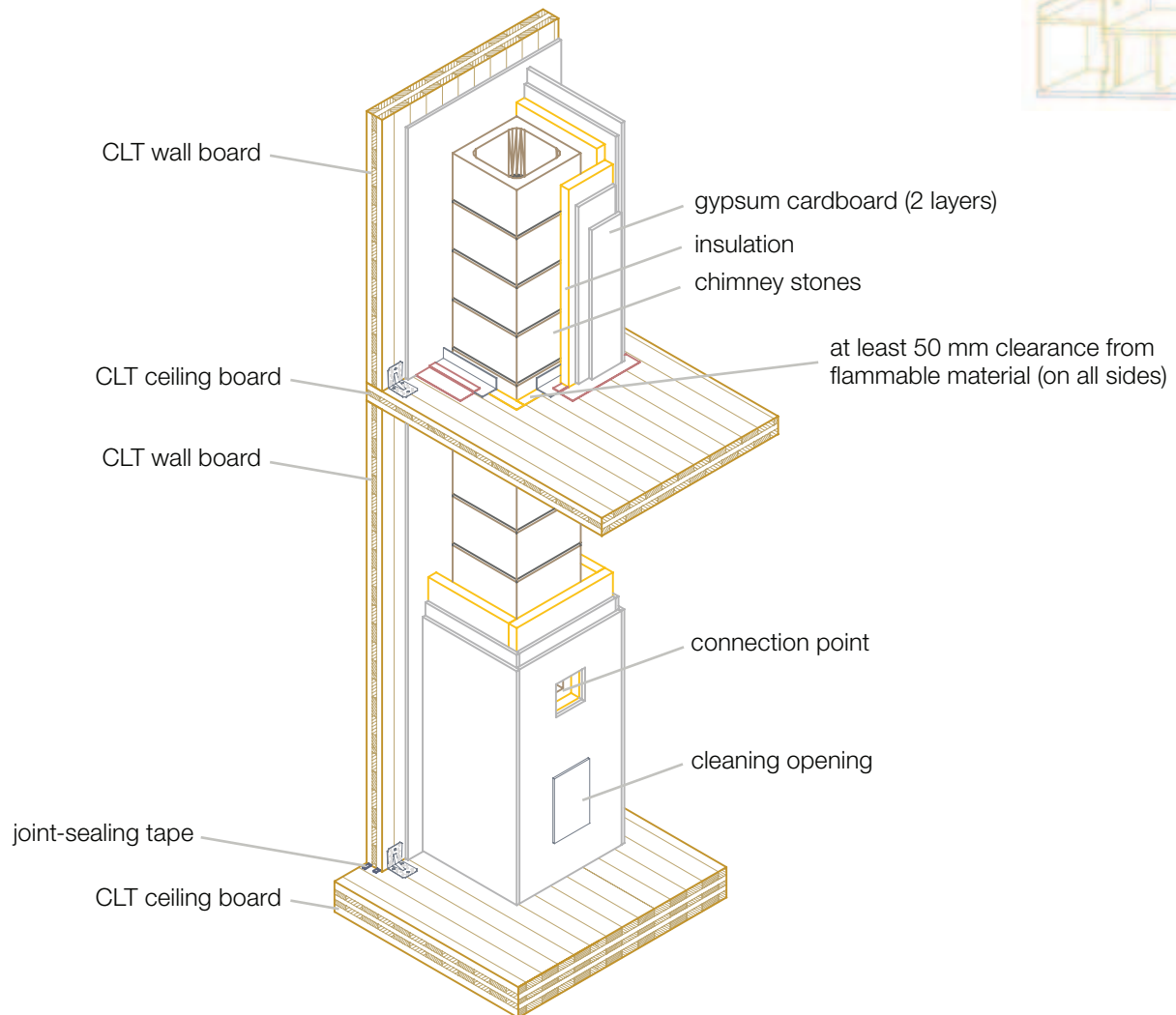
### Execution

- Minimum distances to fireplaces and fire protection requirements specified by the manufacturer must be observed.
- The installation must always be discussed and agreed upon with the authorities and chimney sweep.
- The choice and rating of the connectors and all structural components depend on the structural requirements.

Illustration



## 9.3 Masonry chimney



### Execution

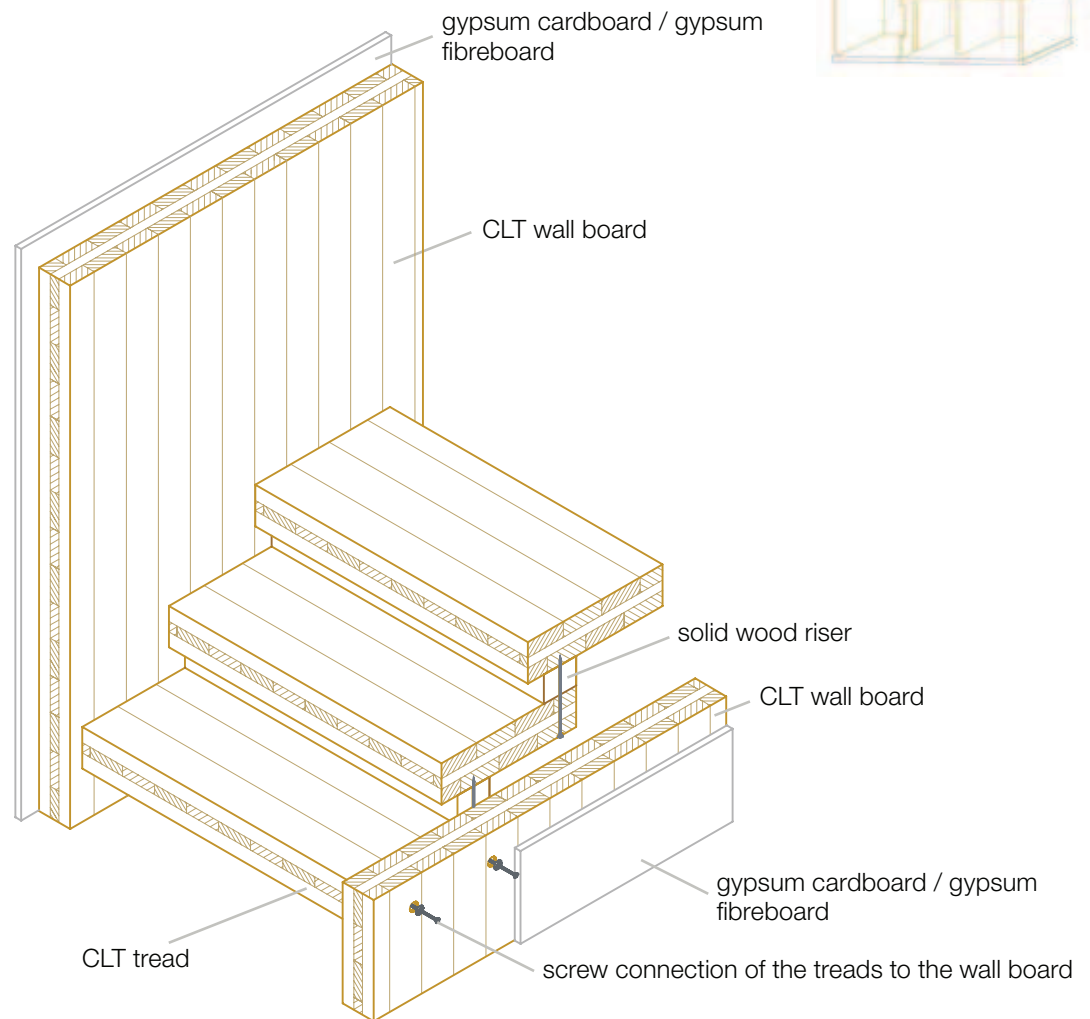
- Minimum distances to fireplaces and fire protection requirements specified by the manufacturer must be observed.
- The installation must always be discussed and agreed upon with the authorities and chimney sweep.
- The choice and rating of the connectors and all structural components depend on the structural requirements.

Illustration



## 10 Stairs

### 10.1 Screw connection to wall boards



#### Execution

- The threads are screwed or fastened to the CLT wall board.
- Treads and risers are connected with screws.
- The choice and rating of the connectors and all structural components depend on the structural requirements.

# Construction

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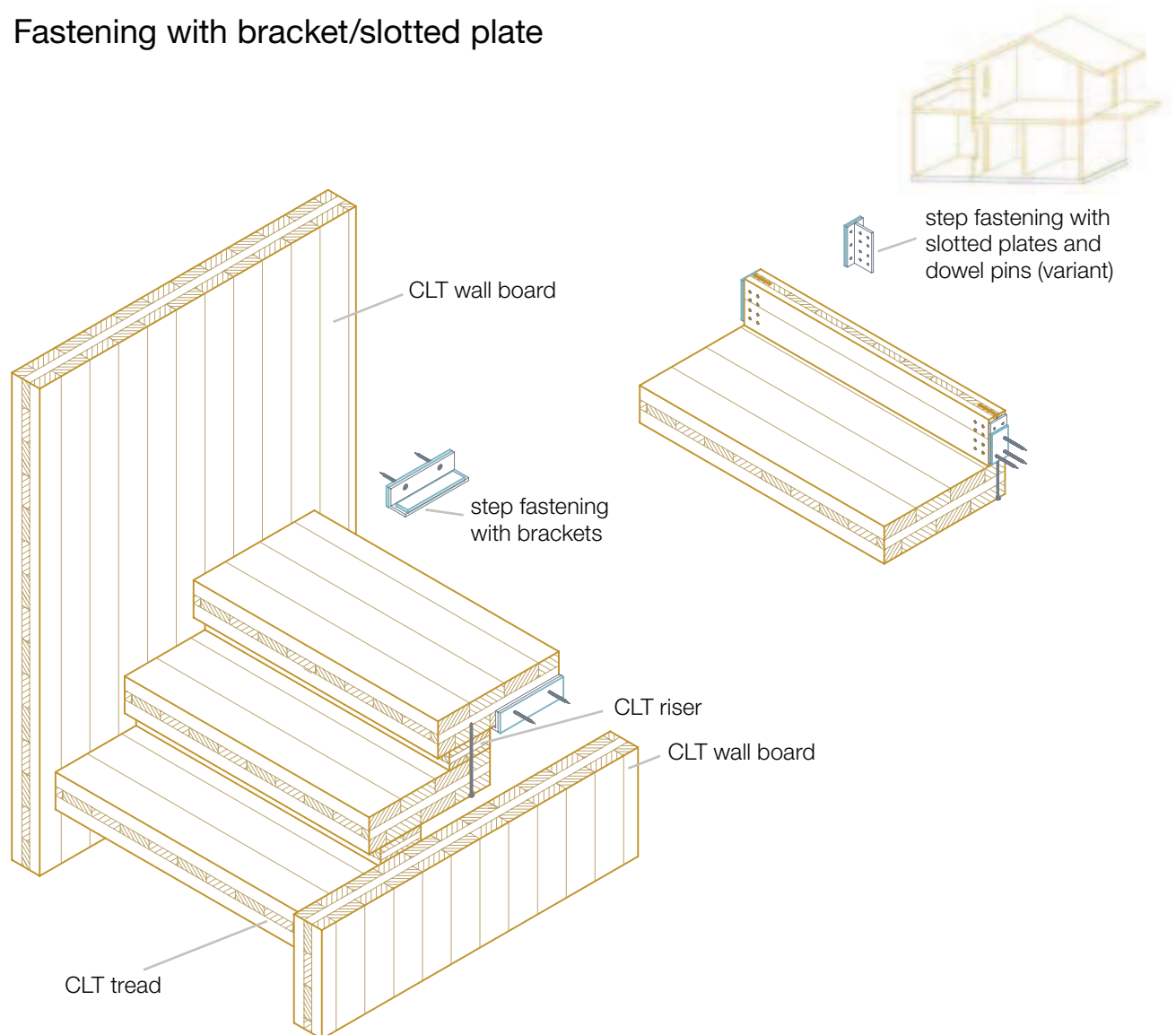
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Illustration





## 10.2 Fastening with bracket/slotted plate

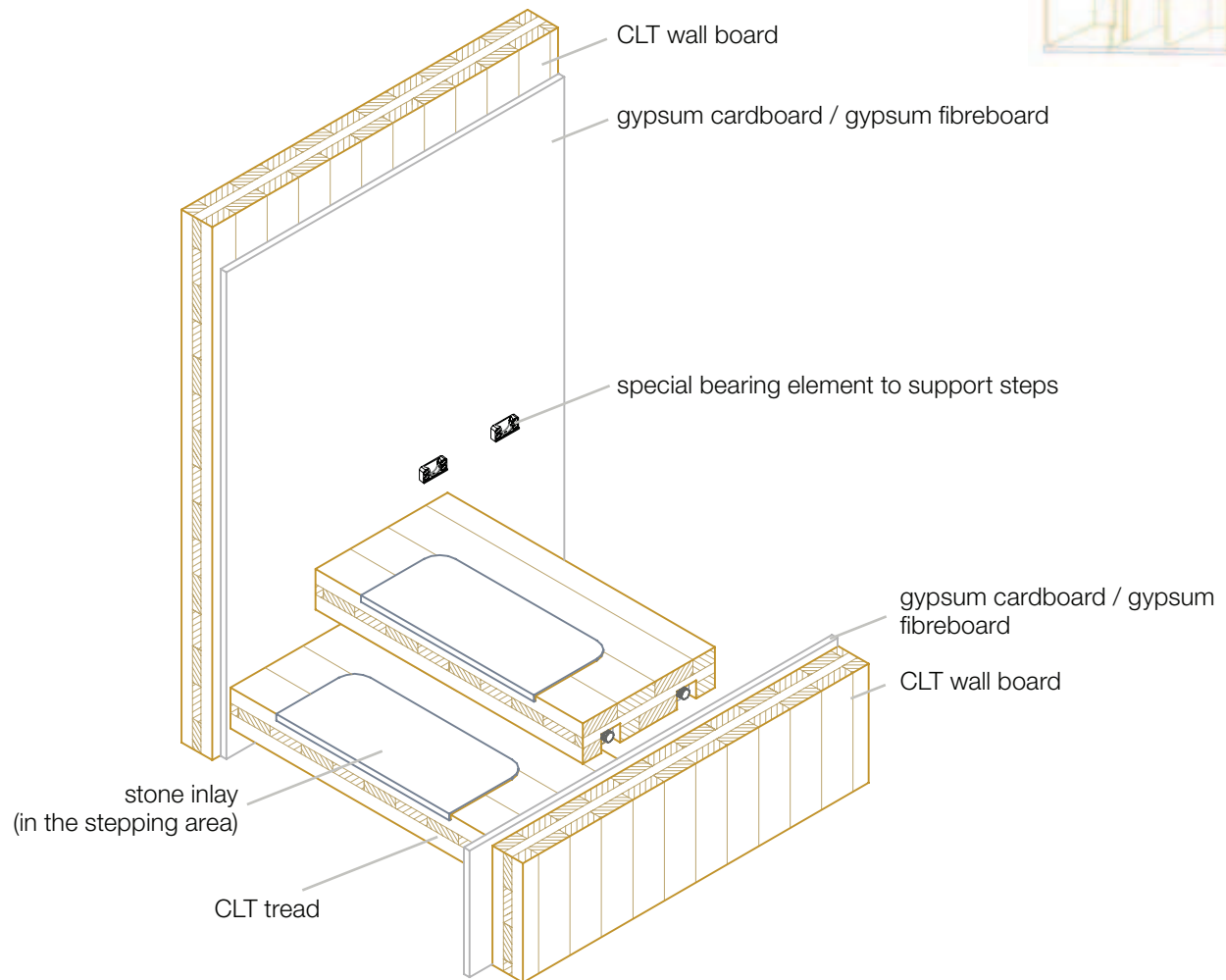


### Execution

- The treads are fastened with brackets or slotted plates and dowel pins (variant) anchored to the CLT wall board.
- Treads must be sound-insulated in the contact area with an elastic intermediate layer (e.g. sylomer).
- The choice and rating of the connectors and all structural components depend on the structural requirements.



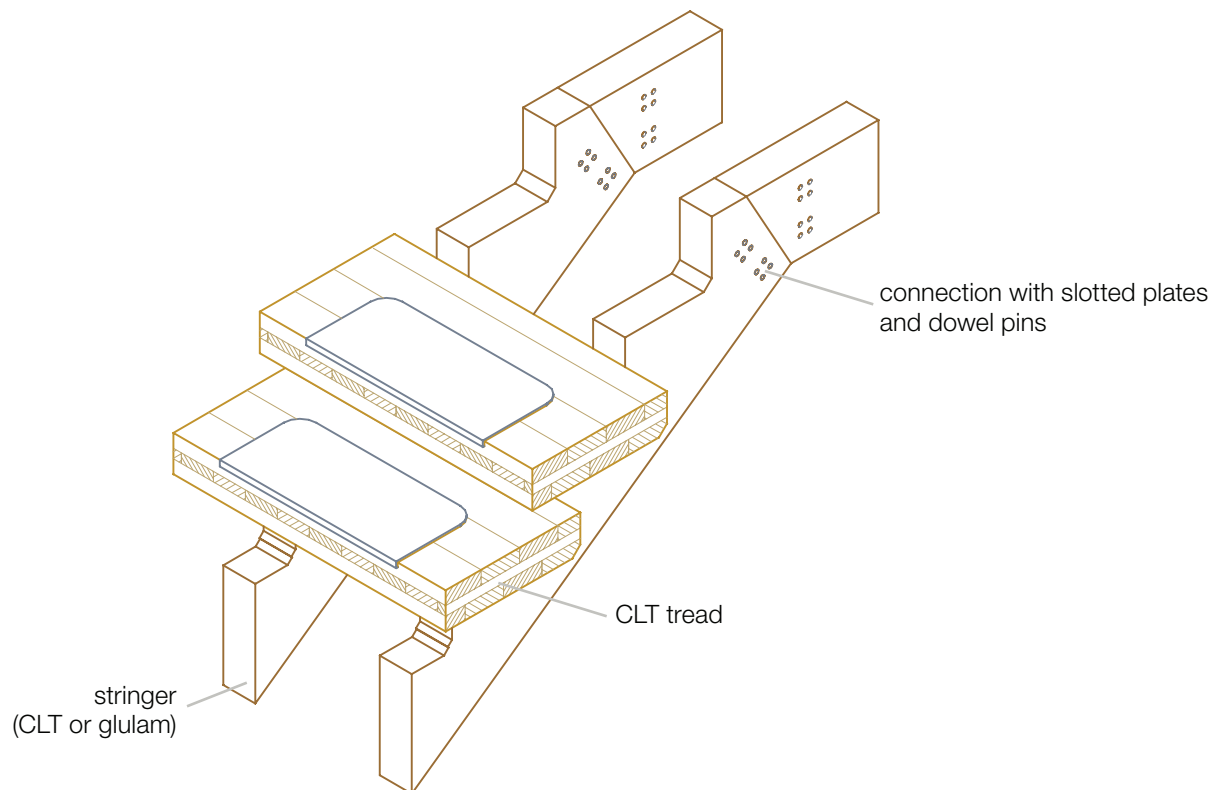
## 10.3 Supported by special bearing elements



### Execution

- The stairs are constructed without risers.
- The treads are mounted on special bearing elements (loads must be taken into account).
- The choice and rating of the connectors and all structural components depend on the structural requirements.

## 10.4 Supported by stringers



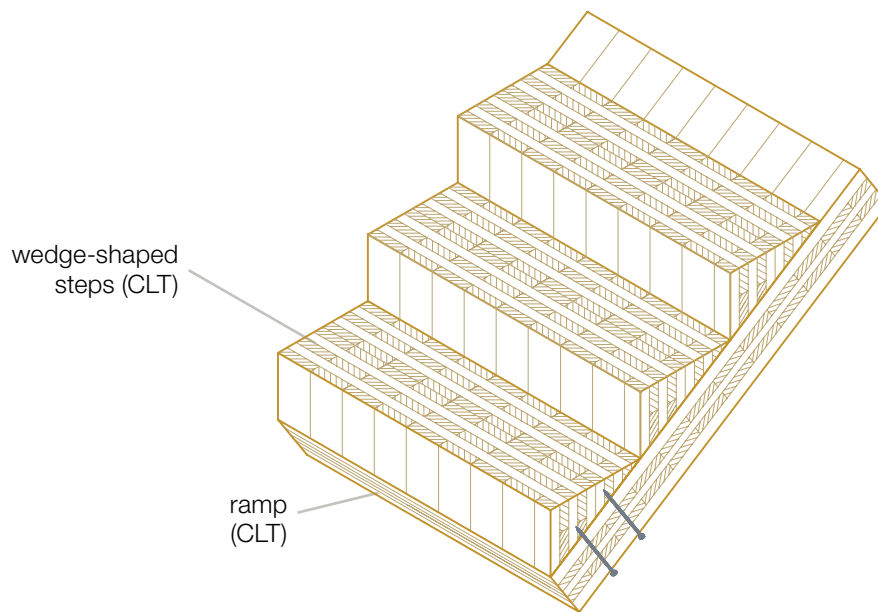
### Execution

- The stairs are constructed without risers.
- The treads are screwed to stringers below the stone inlays in the stepping area.
- The choice and rating of the connectors and all structural components depend on the structural requirements.

Illustration



## 10.5 Ramp



### Execution

- The ramp rests on the ceiling boards, and the steps are screwed to it from underneath.
- The choice and rating of the connectors and all structural components depend on the structural requirements.

Illustration

