„Even the best materials used in a perfect system do not by themselves guarantee absolute perfection of the construction. That is why it is very important for the site managers, assembly companies and especially the craftsmen themselves to take proper care to duly and consistently work in compliance with the prescribed technological procedures and contact us, the manufacturer of the CETRIS® cement bonded particleboards, with trust in the case of any doubt. All our colleagues are ready to provide any information that might help you resolve any particular problem.

We believe that mutual exchange of experience between the manufacturer of CETRIS® cement bonded particleboards and the customer will contribute to the successful implementation of the customer's construction work."

8 CETRIS® Façade Systems

CETRIS®

In addition to improvement of the heat insulation properties of buildings, increased emphasis has been laid on protection of walls against ground moisture and noise absorption and there is also a visible effort to improve the aesthetic appearance of buildings. The relative humidity of heated interiors of residential and office buildings, where we spend up to 90 % of our time, ranges around 60 %. The humidity is pushed to the external surface of the walls where vapours condense. If the walls resist vapour escape for example by ceramic tiling then the vapours accumulate inside the wall. Heat conductivity of the walls is thus increased, while water freezes inside, expands and damages the plaster. Interiors may develop mould. The optimum solution to these problems is application of vented façade systems.

8.1 Application Options of CETRIS® Vented Façades

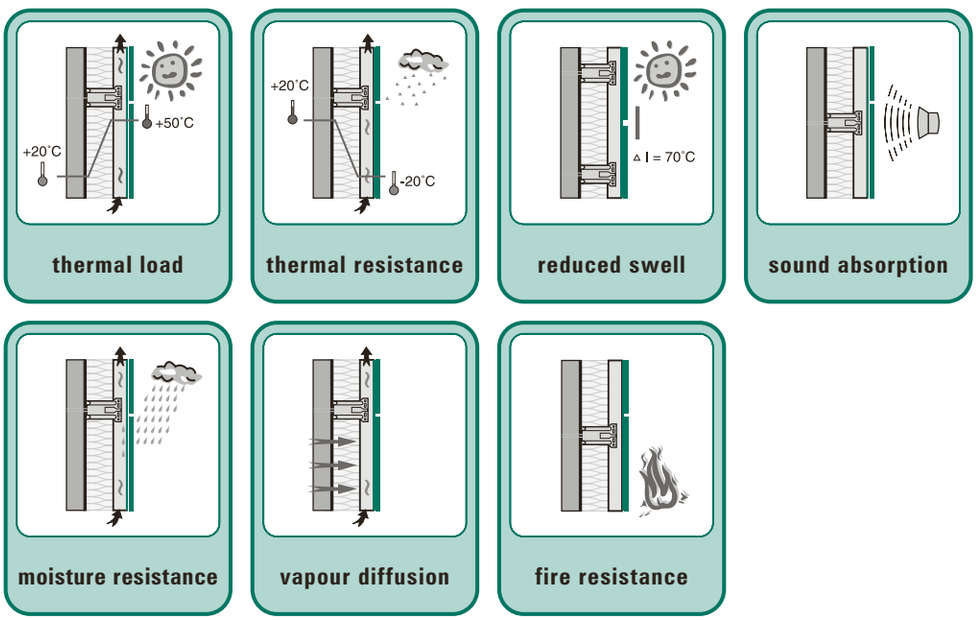
CETRIS® vented façade systems with cement bonded particleboards represent one of the application areas for CETRIS® boards in civil engineering for the protection of peripheral walls against weather effects.
These systems can be used in new developments and for reconstructions of family and apartment houses, office, commercial, industrial and agricultural buildings. The functional and elegant vented façades with CETRIS® boards boards meet high quality, aesthetic, functional and longevity requirements. The vented façade system may be combined with heat insulation.

Description of façade system
Vented façade is an integral part of peripheral construction and that is why the construction must be assessed as a whole from the static point of view, or in the case of heat insulation retrofitting from the thermal point of view.

- Load-bearing construction – enables insertion of heat insulation and fixation of the façade cladding to the load-bearing wall of the building
- Heat insulation – a layer of heat insulating material fixed to the outer face of the peripheral construction of the building
- Façade cladding – protects the load-bearing construction and heat insulation against weather effects and creates the aesthetic appearance of the building

8.1.1 Advantages of CETRIS® Vented Façades

- **Thermal insulation in winter** – optimum design of heat insulation layer thickness in combination with the vented air gap assures minimum energy consumption for winter heating
- **Thermal insulation in summer** – heat attenuation reduces interior overheating in the summer caused by sunshine
- **Suspended façade** – suspended façades effectively protect against direct weather effects and keep heat insulation and the wall completely dry
- **Vapour diffusion** – vented façades favourably affect vapour diffusion in the construction and thus provide for optimum humidity mode both in the wall and in the heat insulation, or eventually allow for wall drying. The chimney effect of the air flowing between the interior lining and heat insulation provides for constant vapour draining
- **Noise absorption** – heat insulation of mineral wool also absorbs sound and considerably contributes to protection of the interior against external noise
- **Façade cladding** – cladding element of CETRIS® boards allows for countless combinations of sizes, shapes, surfaces and colours for excellent materialisation of all requirements for façade architecture
- **The system eliminates potential unevenness of the existing wall**
- **Individual façade elements are easy to replace**
- **Assembly is performed by the dry method**, which allows for year-round implementation of the works



CETRIS® vented façade systems, when used on load-bearing construction, are systems that together with the existing load-bearing construction create a new peripheral coat of the building which is fully compliant with all functional, thermal, static and architectural requirements with preservation of sufficient longevity. In addition, the system provides dryness and warmth for comfort of living.

8.1.2 Categorization of CETRIS® Façade Systems

A) On the basis of orientation of the CETRIS® boards on the façade, the CETRIS® façade systems are classified as follows:

A_1) CETRIS® VARIO Façade System
Boards with visible horizontal and vertical joints between individual façade elements.

A_2) CETRIS® PLANK Façade System
Boards with overlapped horizontal and visible vertical joints.

B) Three types of load-bearing grids may be used for CETRIS® board anchoring on the façade:

B_1) Wooden load-bearing grid

B_2) System profile load-bearing grid on aluminium or zinc-coated steel basis
Systems EUROFOX, SPEEDY, SPIDI etc.

B_3) Combined grid anchors
Anchors + UNI joints + wooden laths

The scope of applications of the vented façade system on wooden and combined load-bearing construction is restricted by fire regulations. Designs of the base construction must comply with relevant laws and standards.

A suspended vented façade system with CETRIS® boards may be fixed to system profiles SPIDI® by SLAVONIA a.s., EUROFOX, DEKMETAL and ETANCO profiles – for details see chapters 8.7.2, 8.7.3, 8.7.6, 8.8.2 and 8.8.3.

8.2 Types of CETRIS® Boards for Façade Systems

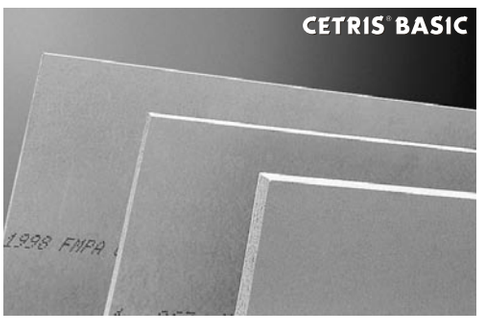
8.2.1 CETRIS® BASIC and CETRIS® PROFIL

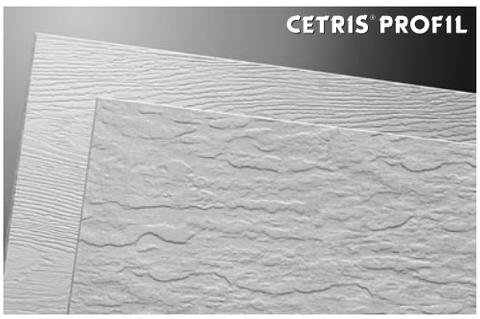
CETRIS® BASIC (CETRIS® PROFIL) is a cement bonded particleboard with a smooth surface (with relief) in the basic variant with a cement gray shade. This board is recommended to be finished with a colour top coat or a transparent paint (in the case of the requirement for preservation of the original cement appearance). The surface finish increases the board protection against weather effects and extends its life.

The recommended paints and technological procedures are listed in Chapter 6 Surface Finishes of CETRIS® Cement bonded particleboard.

When designing façade systems of CETRIS® BASIC (CETRIS® PROFIL) boards without a surface finish it is necessary to respect the board composition and origin – cement product.

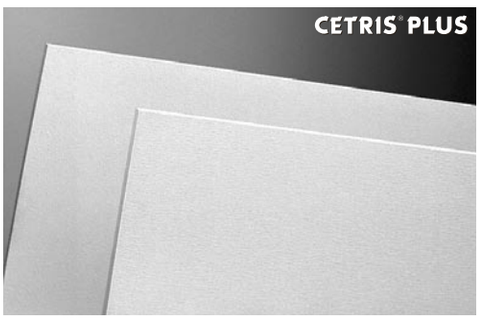
Free lime particles contained in Portland cement may penetrate to the board surface and carbonise in the air with the result of efflorescence disturbing the uniform appearance of the board surface. Therefore complaints about the board appearance cannot be accepted. This phenomenon may partly be prevented by the board treatment with transparent deep penetration paints reducing absorptivity and preventing transport of mineral substances to the board surface.

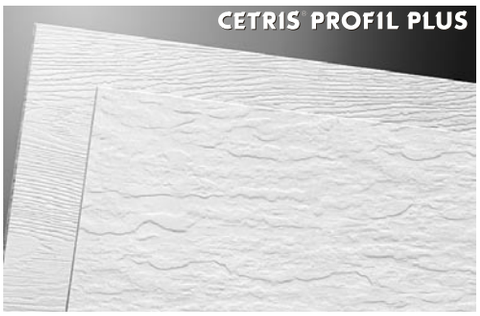




8.2.2 CETRIS® PLUS and CETRIS® PROFIL PLUS

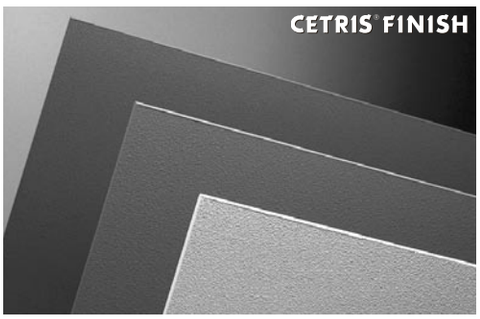
CETRIS® PLUS (CETRIS® PROFIL PLUS) is a cement bonded particleboard with a smooth surface (with relief of wood or slate) with a penetration primer (white). The primer reduces the board absorptivity and improves adhesion of the top coat. These boards must be top coated.





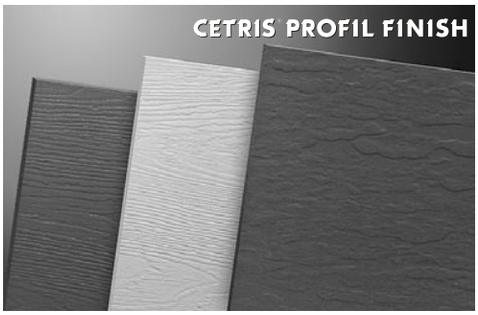
8.2.3 CETRIS® FINISH

CETRIS® FINISH is a cement bonded particleboard with a smooth surface and primer plus top coat in colour shades according to RAL or NCS colour tables.



8.2.4 CETRIS® PROFIL FINISH

CETRIS® PROFIL FINISH is a cement bonded particleboard (thickness 10 or 12 mm) with a relief surface imitating a wood or slate structure. The board is finished with primer plus top coat in colour shades according to RAL or NCS colour tables.



8.3 CETRIS® VARIO Façade System

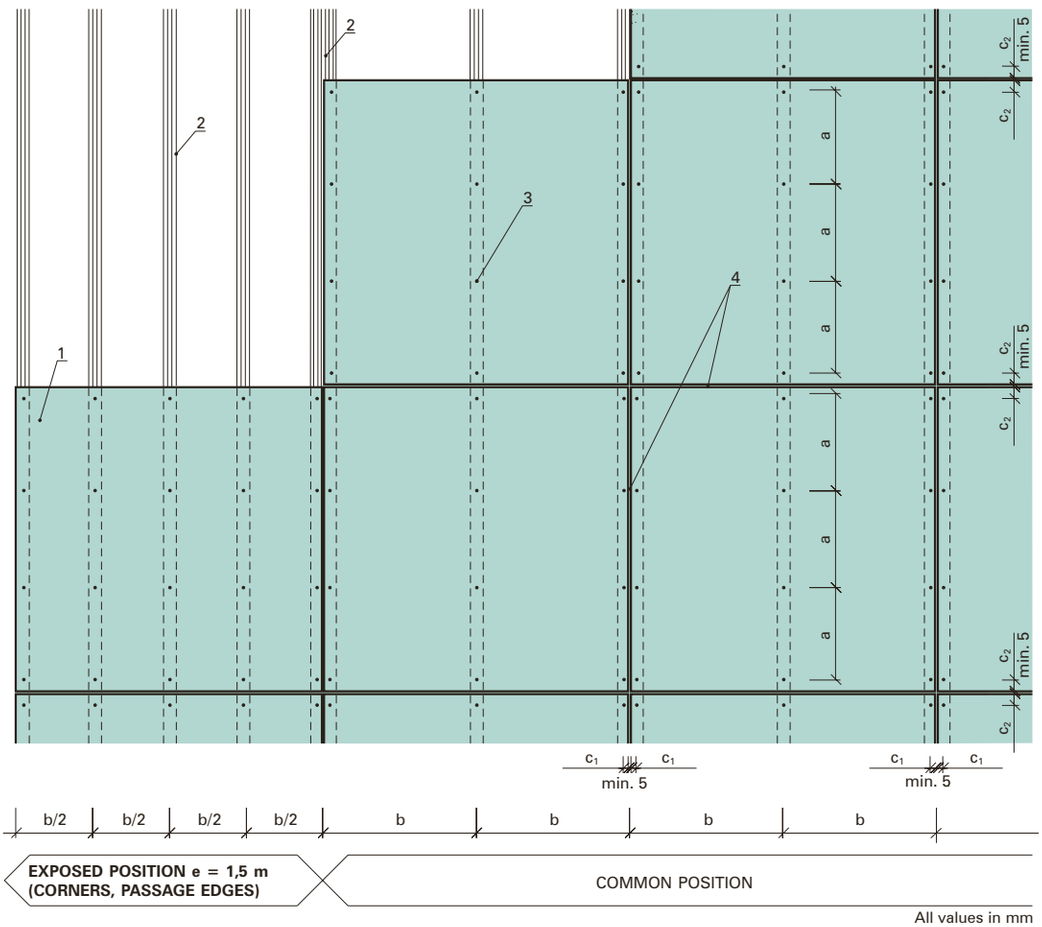
Recommended thicknesses of CETRIS® cement bonded particleboards for façade systems are 10 and 12 mm. For basement lining, higher thicknesses may be supplied.

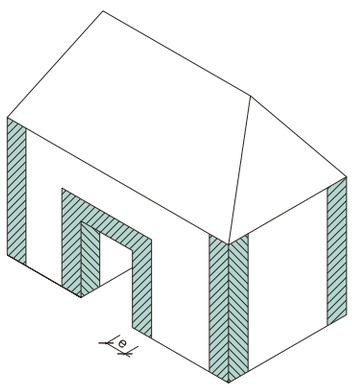
CETRIS® boards for visible joint systems VARIO are available in the maximum size of 1,250 by 3,350 mm. The boards have pre-drilled holes with the diameter of 10 mm (in the case of the maximum size of 1,600 mm the diameter of the pre-drilled holes is 8 mm). The boards may also be supplied pre-cut to the minimum size of 300 by 300 mm. Hole drilling and load-bearing support spans must comply with the applicable technological regulation. Board fixation to the load-bearing construction must allow for dilations caused by volume changes of the façade boards. The individual façade elements must be placed with gaps of at least 5 mm for the element size up to 1,600 mm and at least 10 mm for the element size up to 3,350 mm. In the case of additional hole drilling in the VARIO system, the hole diameter must be 10 mm (or 8 mm in the case of max. size up to 1,600 mm).

BOARD THICKNESS (mm)	SCREW (RIVET) SPANS **a** (mm)	SUPPORT SPACING **b** (mm)	SCREW DISTANCE FROM VERTICAL EDGE c_1 (mm)			SCREW DISTANCE FROM HORIZONTAL EDGE c_2 (mm)
			wood	zinc coat*	aluminium	
8	<400	<420	>25 <50	>30 <50 >50 <70*	>50 <70	>70 <100
10	<550	<500				
12	<500	<625				
14	<550	<625				
16	<550	<700				

* Applicable to lengthwise laying of CETRIS® boards (width > 1,875 mm).
Note: The above values apply to a max. 30 m building height. In the case of taller building cladding with CETRIS® boards please contact the manufacturer.

Diagram of CETRIS® board laying in the VARIO system





Exposed positions on building edges, openings, passages in buildings etc.

e = 1,5 m

01 CETRIS® cement bonded particleboard
02 vertical supports – load-bearing construction
03 screws for CETRIS® board fixation
04 joints between CETRIS® boards

8.4 CETRIS® PLANK Façade System

CETRIS® cement bonded particleboards for the PLANK overlapped joint system are available in widths 300 or 200 mm in the recommended length of max. 1,875 mm (for 12 mm thickness). The boards are provided with pre-drilled holes with the diameter of 5 mm (at least 1.2 multiple of the screw diameter). The hole drilling and load-bearing support spacing must comply with the data in the table below.

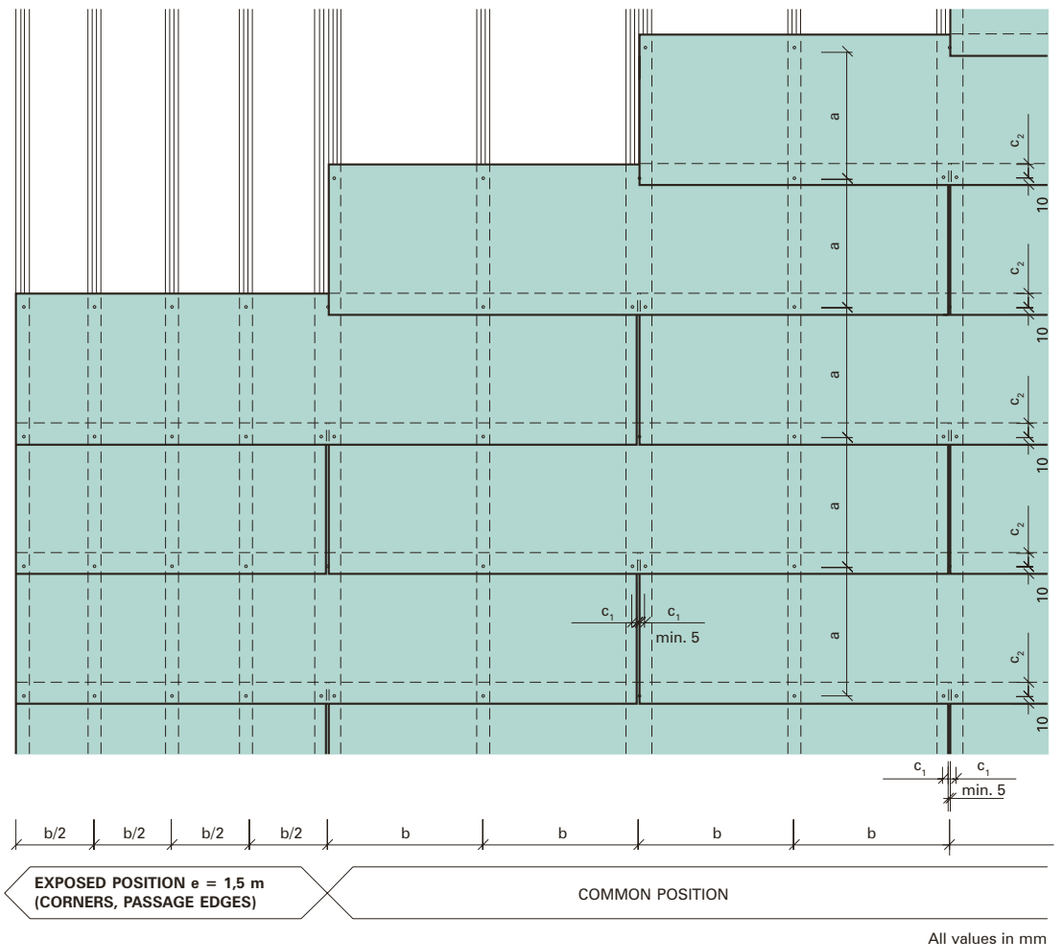
Board fixation to the load-bearing construction must allow for dilations caused by volume changes of the façade boards. The individual façade elements must be placed with joints of at least 5 mm. In the case of additional hole drilling the hole diameter in the PLANK system must be equal to 1.2 multiple of the diameter of the used screw shank.

CETRIS® boards for the PLANK overlapped joint system are supplied with chamfered bottom edge (45 deg.) or phased with semi-circular mill r = 3.2 mm (this does not apply to CETRIS® PROFIL in all modifications).

BOARD THICKNESS (mm)	SCREW SPANS **a** (mm)	SUPPORT SPACING **b** (mm)	SCREW DISTANCE FROM VERTICAL EDGE C_1 (mm)			SCREW DISTANCE FROM HORIZONTAL EDGE c_2 (mm)
			wood	zinc coat	aluminium	
8	<400	<420	>35 <50			40
10	<450	<500				
12	<350	<625				
14	<500	<625				
16	<500	<700				

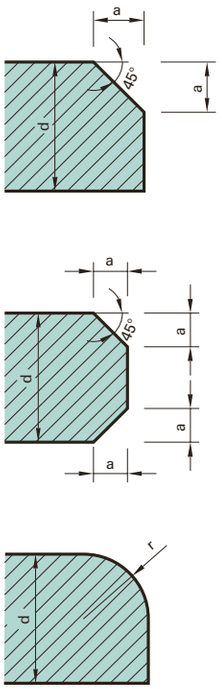
Note: The above values apply to a max. 30 m building height. In the case of higher building cladding with CETRIS® boards please contact the manufacturer.
Warning: The recommended maximum length of CETRIS® board for the PLANK system equals to triple the spacing of the auxiliary vertical profiles (laths) – i.e. for board thickness 10 mm max. 1,500 mm and for board thickness 12 mm max. 1,875 mm.

Diagram of CETRIS® board laying in the PLANK system



All values in mm

Edge chamfering, edge rounding in the case of CETRIS® boards for the PLANK system



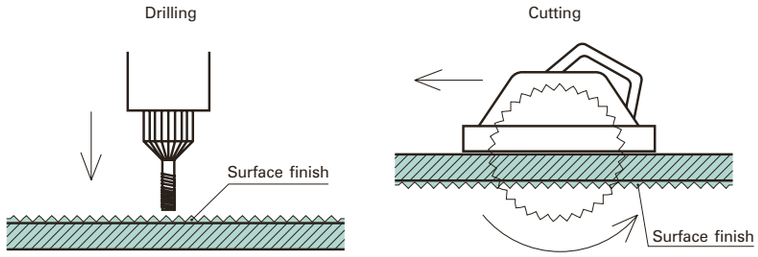
a = min. 2 mm, max. 5 mm
r = 3.2 mm
d = thickness of CETRIS® cement bonded particleboard

8.5 Processing of CETRIS® Façade Boards

CETRIS® cement bonded particleboards can be cut with a circular saw with a hard metal tipped blade. For a clean and straight cut it is necessary to use a guide bar and cut the broads from the reverse side to protect the front face against damage.

Holes are pre-drilled with a no impact drill on a firm surface. It is recommended to use a drill bit for metal drilling. The holes are drilled from the front side.

Processing of CETRIS® boards with surface finish



8.6 Packaging and Storage of CETRIS® Façade Boards

CETRIS® cement bonded particleboards are supplied on wooden transport pallets wrapped in protective foil. The individual CETRIS® FINISH and CETRIS® PROFIL boards are separated with softened inlays preventing board damage during transport. The boards may be stored wrapped on a stable firm surface in a dry place protected against rain and dust.

8.7 Composition of CETRIS® Façade System

8.7.1 Base Construction

The base construction must meet all requirements of the relevant technical standards for these constructions (prescribed by Czech national technical standards – ČSN, construction and technical certificates, and technological procedures). They must above all be homogeneous, coherent, firm and straight, both locally and overall. The individual firmness values for the base are given by the requirements of the individual manufacturers of anchoring technologies and their regulations for designs of individual anchoring elements.

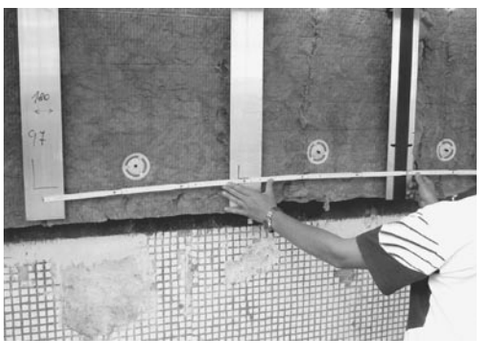
8.7.2 Heat Insulation

Where heat insulation is required use hydrophobic boards of mineral fibre of WV type pursuant to DIN 18165 with a valid national certificate is recommended. The recommended classification of reaction to fire pursuant to EN 13 501-1 is A1, or A2, as the case may be. The minimum thickness of the boards is given by the manufacturing programmes of the individual manufacturers and the requirements for heat resistance of the insulation layer (thermal technical calculation).

Recommended types of mineral boards

Manufacturer, contact	Product	Diffusion resistance factor	Heat conductivity coefficient	Flammability level pursuant to EN 13 501-1
Saint-Gobain Insulations www.isover.com	ORSIL FASSIL	1.4	0.035 W/mK	A1
	ORSIL HARDSIL	1.0	0.035 W/mK	A1
Rockwool International A/S www.rockwool.com	AIRROCK ND	3.55	0.035 W/mK	A1
	AIRROCK ND	3.55	0.035 W/mK	A1

The insulation boards are fixed with disc dowels in lengths as instructed by the manufacturer.
The minimum number of dowels per m² is given by instructions of the mineral board manufacturers.



8.7.3 Air Gap

The air gap serves for exhaustion of atmospheric humidity and rain and snow moisture penetrated into the open system through joints and for removal of humidity diffusing from the base construction. In the summer the air gap prevents temperature increase in the load-bearing base construction. Humidity condensation in the vented space mainly depends on the intensity of volume flow and speed of the venting stream. The minimum size of the air gap is 25 mm, max. 50 mm.

8.7.4 Wind Tight Safety Hydro Insulation

The basic function of these membranes is to provide for wind tightness and limit air movement from/to heat insulation. Another function of these membranes is to prevent water penetration and effectively remove vapours.

The most frequent manifestations of air movement inside the vented façade in the gap between the lamellas and the heat insulation include chimney effect and wind. Thanks to this movement there is heat loss by air flow – heat is exhausted from the heat insulation. In the same way mechanical particles may get into the insulation such as dust which may absorb moisture and negatively affect heat insulation properties. Water may get into the construction of the suspended façade in different ways (rain, gravitation etc.).

A suitable product is DuPont™ Tyvek® Façade – a wind tight and highly vapour permeable membrane. The membrane is laid directly on the surface of the heat insulating materials, anchored with disc dowels and Tyvek® system tape in the places of anchor and disc dowel piercing of the membrane and in the places of membrane overlaps.

8.7.5 Wooden Load-Bearing Grid

Load-bearing constructions
The load-bearing construction consists of a wooden lath and plank grid. The laths and the planks are made of quality spruce cut timber dried to a max. 12% humidity. Thus dried timber is impregnated with a suitable agent against mould and rot.

Primary – horizontal – grid
This grid is used with added heat insulation. The thickness corresponds to the thickness of the insulation, minimum width 50 mm. The size, the anchoring and the spacing are to be specified by the designer on the basis of static and thermal technical assessment of the peripheral construction.

Secondary – vertical – grid
The grid forms the venting gap between the façade coat and the load-bearing construction for the façade boards. The lath thickness depends on the structure of the primary grid laths and on the gap venting profile – the minimum cross section should be 250 cm^2/m and the max. 500 cm^2/m. This means the minimum distance of the inside face of the façade board from heat insulation or load-bearing wall of the building is 25 mm and the max. is 50 mm.

The laths are fixed to the primary grid in spacing depending on the type of the façade cladding. The lath width in the places of contact of two façade elements is a min. 80 mm, the laths in between are 50 mm wide.

8.7.6 Aluminium Load Bearing Grid – Profiles STYL 2000

Load-bearing construction
The load-bearing construction is supplied by the company STYL 2000 Brno. The EUROFOX system was developed by a company in Austria of the same name as load-bearing construction for vented façade coats. The STYL 2000 load-bearing construction consists of a set of anchors, profiles and beams. The whole construction is corrosion-resistant thanks to its composition (aluminium, noble aluminium alloys /Al+Mg+Si/, or stainless steel) and resistant to aggressive environments. The economical, statically optimised construction of the basic elements of the system allows for a construction thickness of the coat ranging from 80 mm to 330 mm. Stability of the STYL 2000 load-bearing construction with regard to heat load is given by the system of fixed points and sliding beds (pre-drilled circular and oval holes in FOXI elements for load-bearing profile fixation).

The basic FOXI load-bearing elements level planarity defects of the base constructions within the scope up to 35 mm in the plane perpendicular to the basic reference plane thanks to the connection with the vertical load-bearing profiles using the groove and tongue system.

FIXI Anchoring Element
The FIXI anchoring element is made of aluminium alloy AlMg pursuant to DIN 4113, size 32/48/3 mm. The contact surface to the FOXI anchor is notched for increased static action. A circular hole is pre-drilled in the anchoring element with a diameter of 10.5 or 14.5 mm for fixation to the base with a screw and dowel.

Elements of STYL 2000 System

FOXI Anchoring Element
The FOXI anchoring element is made of aluminium alloy AlMg pursuant to DIN 4113, L shape, size 80/80 to 290 mm, sheet thickness 2 mm. It includes two circular holes with a diameter of 20 mm for the fixation of the FIXI element with a screw and a dowel to the base. For connection with vertical beams the elements are provided with a groove with two circular holes with a diameter of 50 mm (fixed point) and two oval holes with a diameter of 5.0/15 mm (slide connection).

T, L and Corner Vertical Beams
The T, L and corner vertical beams are made of aluminium alloy Al Mg Si 05 F25 pursuant to DIN 4113, length 6,000 mm, sheet thickness 1.6 mm.

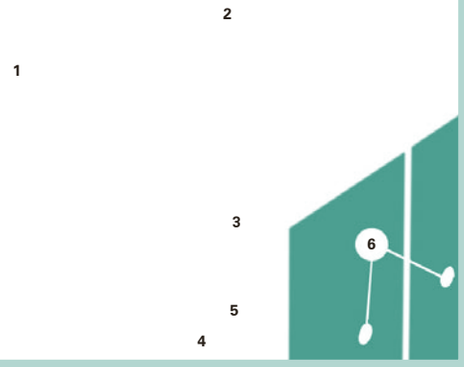
L profile	size 60/40 mm
T profile	size 60/80 mm
Corner profile	size 30/30 mm

UNI Joint
To form the load-bearing grid of combined materials (aluminium anchor, wooden vertical beam) there is the UNI joint. The connections of the individual elements are secured with screws. All wooden elements must be impregnated for protection purposes.

Self-Cutting Screws 4.2/16 mm
Self-cutting screws 4.2/16 mm are made of noble steel A4 (corrosion-resistant, stainless) pursuant to DIN 4113. They are used for mutual interconnections of FOXI elements with vertical beams, for connections of auxiliary untypical profiles with the vertical beams pursuant to the project requirements.

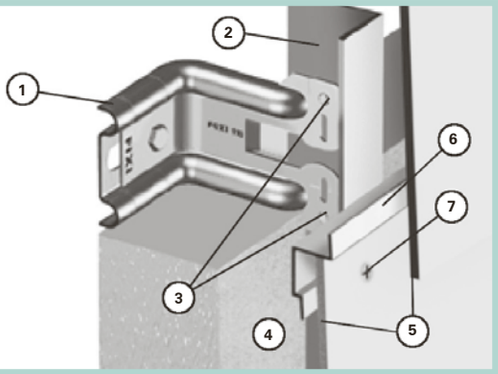
Auxiliary Profiles
Auxiliary profiles are made by local manufacturers pursuant to the project requirements from sheet metal, thickness 1 – 2 mm, of aluminium alloy AlMg 3 pursuant to DIN 4113.

Elements of STYL 2000 system
FTA-V-100



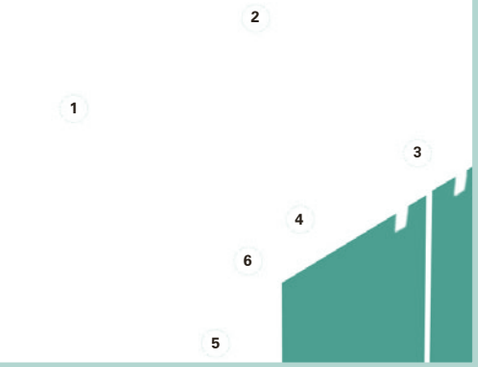
1 FOXI load-bearing anchor with screw and dowel
2 vertical T beam
3 stainless self-cutting screws
4 heat insulation of mineral hydrofobized boards
5 CETRIS® cement bonded particleboard
6 stainless screw

Elements of STYL 2000
FLZ-v-500



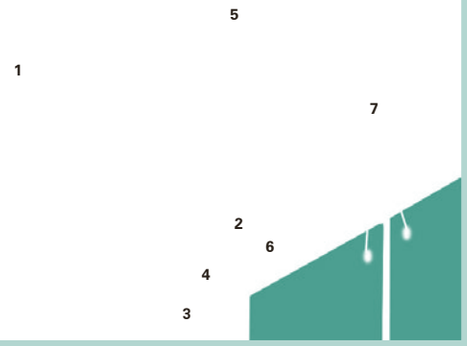
1 FOXI load-bearing anchor with screw and dowel
2 vertical L beam
3 stainless self-cutting screws
4 heat insulation of mineral hydrofobized boards
5 CETRIS® cement bonded particleboard
6 horizontal beam
7 stainless screw

Elements of STYL 2000
FTC-v-200



1 FOXI load-bearing anchor with screw and dowel
2 vertical T beam
3 aluminium clamps for fixation of CETRIS® cladding boards
4 stainless self-cutting screws
5 heat insulation of mineral hydrofobized boards
6 CETRIS® cement bonded particleboard

Elements of STYL 2000
FUH-v-200



1 FOXI load-bearing anchor with screw and dowel
2 stainless self-cutting screws
3 heat insulation of mineral hydrofobized boards
4 CETRIS® cement bonded particleboard
5 wooden impregnated beam
6 UNI joint for wooden beam fixation
7 stainless screw

8.7.7 Auxiliary Materials

Screws for fixation of CETRIS® cement bonded particleboards to a grid

For fixation of CETRIS® cement bonded particleboards **in the PLANK system** (overlapped system), stainless or galvanised screws with sunken heads are used.

Screws recommended for CETRIS® boards in the PLANK system, thicknesses 10 (12) mm, wooden load-bearing construction:

- Self-cutting screw for anchoring of CETRIS 4.2 × 35 mm.

- EJOT screw Climadur-Dabo 4.8 × 35 mm

Screws recommended for CETRIS® boards in the PLANK system, thicknesses 10 (12) mm, EuroFox load-bearing construction:

- EJOT screw Climadur-Dabo TKR 4.8 × 35 mm

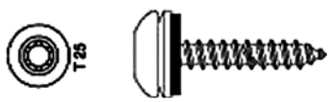
For fixation of CETRIS® boards **in the VARIO system** (visible joints), stainless or galvanised screws with semi-circular or hexagonal heads with water-tight washers are used. These washers are coated on the bottom side with vulcanised elastomer EPDM for water-tight and flexible material joining. The type of the bolt/screw also depends on the base type – the load-bearing grid used.

Screws/bolts recommended for anchoring of CETRIS® boards in the VARIO system, wooden load-bearing construction:

- JT 3 – 2 – 4,9 × 35 – E 14 (max. CETRIS® board thickness 12 mm)

- JT 4 – FR – 2 – 4,9 × 35 – E 14 (max. CETRIS® board thickness 12 mm)

- JA 3 – LT – 4,9 × 38 – E14 (max. CETRIS® board thickness 14 mm)



- SFS TW-S-D12-A14-4.8 × 38, semi-lens timber
- Mage 7060 screw Topex 4.8 × 45 mm, timber, hexagon (max. board thickness 12 mm)
- Mage 7341 screw Topex Ufo 4.8 × 45 mm, timber, semi-lens (max. board thickness 12 mm)
- Visimpex CIBDJ 4,8 × 35 mm

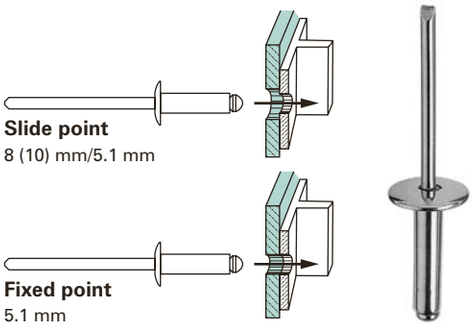
Screws/bolts recommended for anchoring of CETRIS® boards in the VARIO system, aluminium or zinc-coated load-bearing construction:

- JT 2 – 3 – 4,8 × 25 (38) – V 14

- JT 2 – 3 – 4.8 × 25 (38) – V 14
- SFS SX 3/15-L12-S16 – 5.5 × 38 mm – head IRIUS, CETRIS® board thickness 14 mm)
- SFS SX 3/15-S16 – 5.5 × 38 mm – hexagonal head, clamping length 15 mm
- Mage 7010 – self-cutting screw Topex Ufo 4.8 × 38 mm, to Al zinc-coated, semi-lens (max. board thickness 12 mm)

CETRIS® board anchoring with rivets

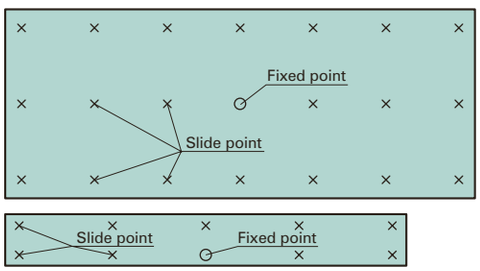
- CETRIS® board needs to be pre-drilled, diameter 8 mm in the case of slide point (or 10 mm for board lengths above 1,600 mm), or 5.1 mm for fixed point (diameter of rivet body).
- The positions of the pre-drilled holes in the board are similar to board anchoring with screws, with one hole in the board pre-drilled with the diameter of 5.1 mm (for the fixed point). The position of the fixed point is chosen pursuant to the board shape and the number of the holes, see diagram:



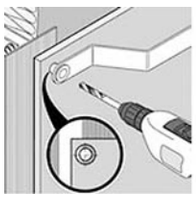
Slide point
8 (10) mm/5.1 mm

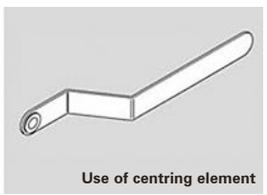
Fixed point
5.1 mm

- Stainless rivets are recommended for riveting, or zinc-coated rivets with powder paint variant are also acceptable. The minimum diameter of the rivet head is 14 mm. The length of the rivets depends on the clamping length (thickness of CETRIS® board + thickness of the load-bearing façade construction profile).



x ..... Slide point
o ..... Fixed point





Use of centring element

Recommended rivet types

- SFS - AP 14 - 50180 - S (size 5.0 × 18.0 mm, head Ø 14 mm, clamping length 10.5 – 15.0 mm)
- SFS - AP 16 - 50180 - S (size 5.0 × 18.0 mm, head Ø 16 mm, clamping length 10.5 – 15.0 mm)
- EJOT - K14 - Al/E 5 × 18 mm (head Ø 14 mm, clamping thickness 12 – 14 mm)
- ETANCO rivet Alu/stainless open 4.8 × 18 mm (head diameter 16 mm, clamping thickness 12 – 14 mm)
- BS 4. 8 × 25 mm aluminium/stainless A2, head diameter 16 mm, clamping thickness 15 mm

Note:
When anchoring CETRIS® boards with screws or rivets it is necessary to install the anchoring elements exactly to the centre of the pre-drilled hole (diameter of pre-drilled hole is 10 mm or 8 mm pursuant to the lengths of the CETRIS® board). Centring elements may be used for accurate installation (for drilling, screwing).

System of Invisible Fixation (Gluing) of CETRIS® Boards – SikaTack® Panel
In the case of a requirement for invisible fixation (only applies to the VARIO system and vertical cladding) the CETRIS® boards may be glued to the grid. The recommended system is supplied by the Sika Company and consists of:

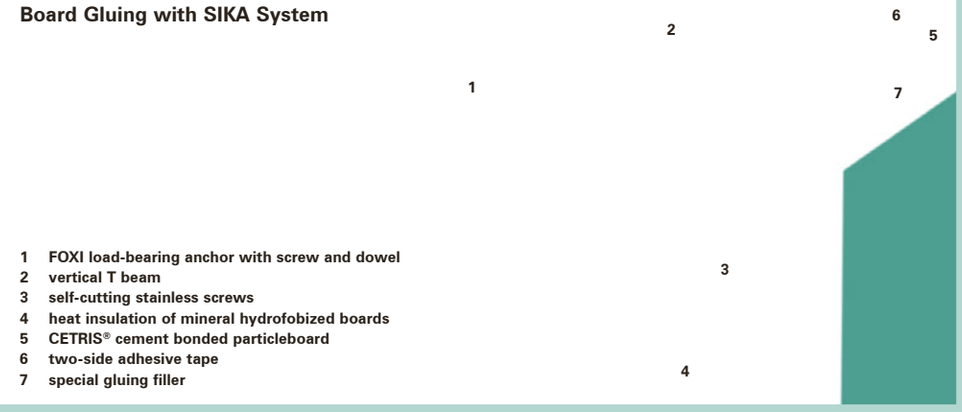
- Sika® Cleaner 205 – cleaner and activator for preparation of the glued surface with short venting time
- SikaTack® Panel Primer – primer for cladding boards, aluminium or wooden load-bearing elements
- SikaTack® Klebeland – assembly tape – two-sided adhesive tape for quick fixation of façade boards
- SikaTack® Panel – gluing filler

Gluing by this technology may only be performed by trained companies and employees, strictly following the effective technological procedure issued by Sika. Technical consultation with the technological department of Sika before gluing is necessary.

Basic principles for use of the SikaTack® Panel gluing system for CETRIS® cement bonded particleboard gluing:

- Recommended board thicknesses 10 and 12 mm
- Suitable bases – aluminium profiles and wooden laths (with planed surface on the gluing side), in the case of zinc-coated profiles surface treatment is necessary (pursuant to the instructions of the gluing system supplier)
- Maximum spacing of supports 500 mm (for 10 mm thickness), or 625 mm (for 12 mm thickness), maximum length of the CETRIS board equals to triple the max. support spacing (i.e. 1,500 mm for 10 mm thickness and 1,875 mm for 12 mm thickness)
- The profiles must not be oriented horizontally, maximum acceptable profile (lath) length 5 m, dilations between profiles (laths) is necessary
- Dry execution, ambient temperature within the range +10° C to +30° C and for at least 5 hours after the assembly the lower limit may not be exceeded
- Board gluing recommended up to max. 12 m height
- Assembly may only be performed by trained staff acquainted with all principles and requirements.

Board Gluing with SIKA System



1 FOXI load-bearing anchor with screw and dowel
2 vertical T beam
3 self-cutting stainless screws
4 heat insulation of mineral hydrofobized boards
5 CETRIS® cement bonded particleboard
6 two-side adhesive tape
7 special gluing filler

Joining Flexible Fillers
For CETRIS® cement bonded particleboard laying in the PLANK systems flexible fillers are recommended for application under the free ends of the façade boards. The recommended types are acrylic fillers with tensile strength min. 0.1 MPa.

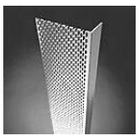
Rubber Tapes and Washers
Rubber tapes and washers are used as prevention of contact and fissure corrosion resulting from contact between elements of aluminium alloys and other metals, or for the extended life of wooden constructions (the washers are placed under the vertical joint in the points of contact between two cladding boards on a wooden grid).

Anchoring Technique
Wooden grids are fixed with HILTI HRDU, MUNGO, MEA, EJOT, UPAT, POLYMAT etc. frame dowels. The layout and types of the dowels is specified by the designer. Stainless or galvanised screws are to be used for fixation of vertical laths to horizontal ones (secondary and primary grid).

Complementary Profiles (Laths) to the Façade System
Details of suspended vented façades (bottom end – venting, upper end – venting, cladding of the openings, external/internal corners etc.) are resolved with shaped profiles (laths) of zinc-coated metal (with optional colour finish), aluminium sheets or PVC (Protector, Baukulit, DK GIPS systems).

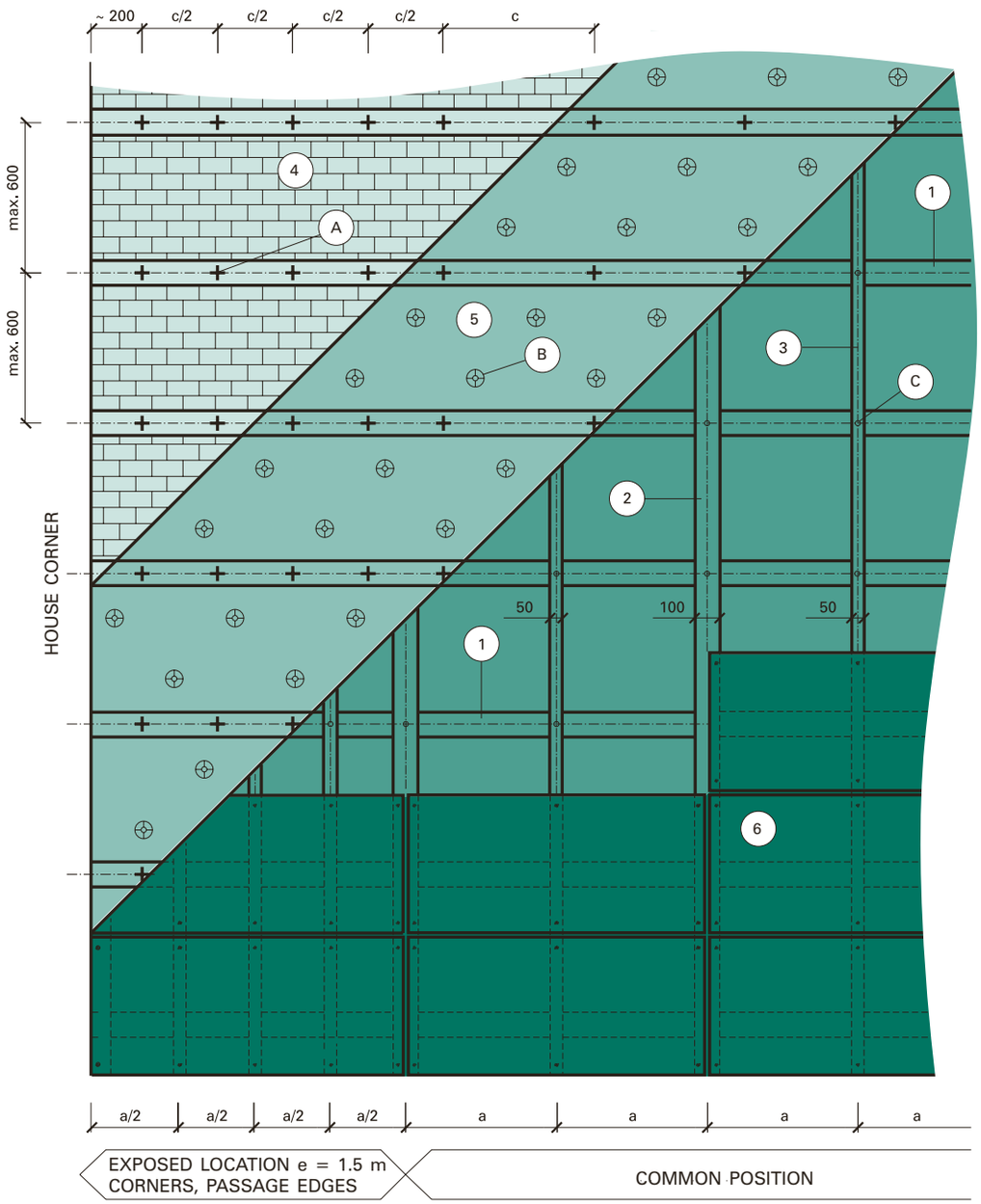
Clamps for Cladding Board Fixation
Alternatively the CETRIS® cement bonded particleboards may be clamped or clipped with ETANCO clips. In this case, due to the local fixation of the board along the perimeter only the maximum acceptable format of the CETRIS® board is 400 by 400 mm. **Use of larger formats must be consulted with the manufacturer!**





8.8 Technological Procedure of Assembly of CETRIS® Façade System

CETRIS® VARIO façade system sectional view with thermal insulation on wooden grid



Key to anchoring elements:

A) Fixation of horizontal profiles to house wall:
- Concrete wall – frame dowel Hilti HRD, c = 750 mm
- Porous concrete – frame dowel Hilti HRD, c = 600 mm
- Masonry wall – frame dowel Hilti HRD, spacing c = 600 mm
- Base load-bearing capacity must be tested especially in the case of porous concrete

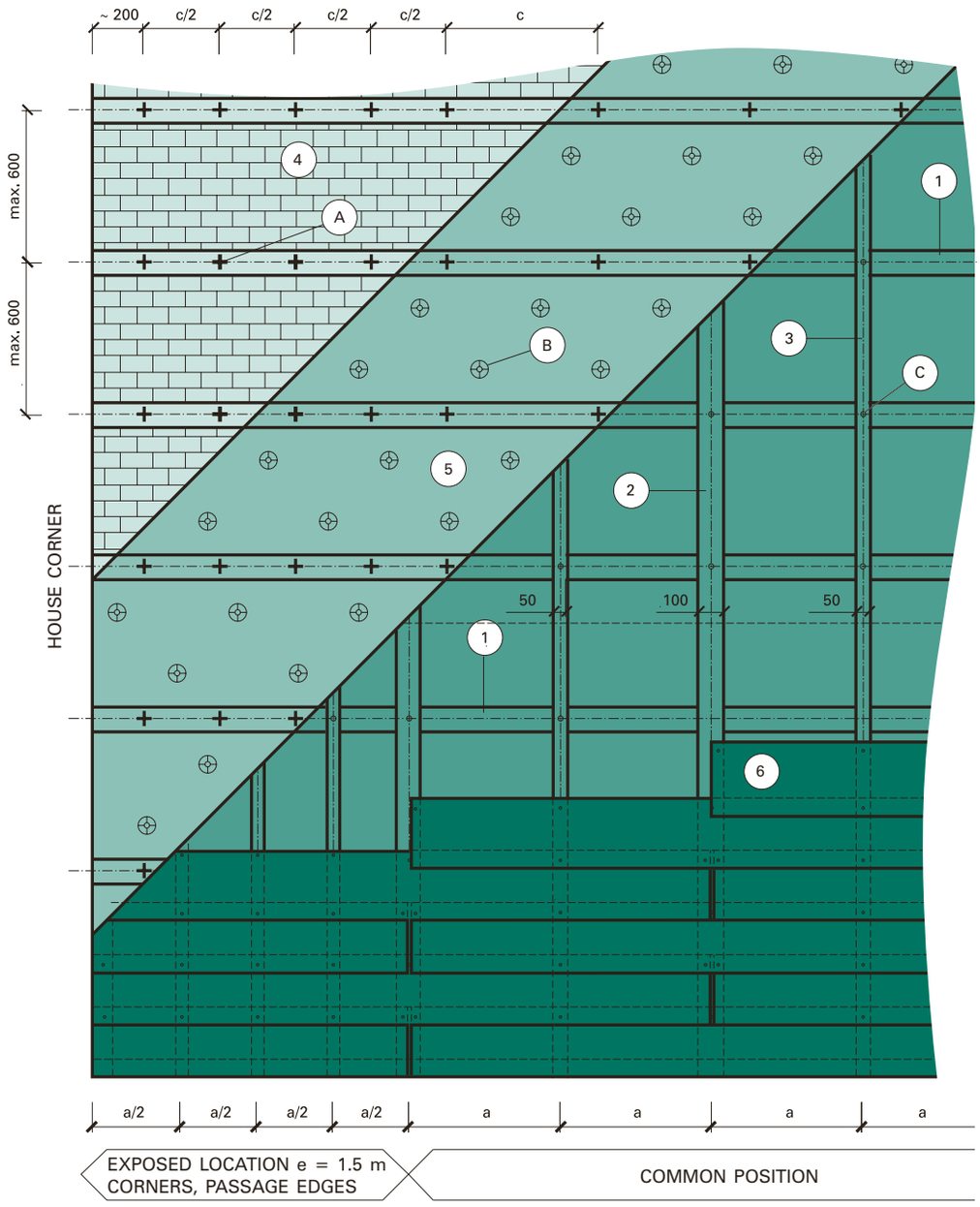
B) Fixation of heat insulation layer:
- Disc dowels (depending on the insulation type and thickness) pursuant to the instructions of the insulation material manufacturer

C) Fixation of vertical laths to horizontal profiles:
- Screws 6.3 × 80 mm, min. galvanised

1 horizontal wooden profiles min. 100× heat insulation thickness in mm
2 vertical wooden laths 100 × 32 mm
3 vertical wooden laths 50 × 32 mm
4 base construction
5 heat insulation
6 CETRIS® cement bonded particleboard

All values in mm

CETRIS® PLANK façade system sectional view with thermal insulation on wooden grid



Key to anchoring elements:

A) Fixation of horizontal profiles to house wall:
- Concrete wall – frame dowel Hilti HRD, c = 750 mm
- Porous concrete – frame dowel Hilti HRD, c = 600 mm
- Masonry wall – frame dowel Hilti HRD – spacing c = 600 mm

B) Fixation of heat insulation layer:
- Disc dowels (depending on the insulation type and thickness) pursuant to the instructions of the insulation material manufacturer
- Base load-bearing capacity must be tested especially in the case of porous concrete

C) Fixation of vertical laths to horizontal profiles:
- Screws 6.3 × 80 mm, min. galvanised

1 horizontal wooden profiles min. 50× heat insulation thickness in mm
2 vertical wooden laths 100 × 32 mm
3 vertical wooden laths 50 × 32 mm
4 base construction
5 heat insulation
6 CETRIS® cement bonded particleboard

All values in mm

8.8.1 Assembly of Wooden Load-Bearing Façade Construction

Specification of basic axes and reference plane for brick laying
If possible the basic axes should be specified, especially the widths of the little pillars between windows, together with the reference plane for façade coat base plane.

Load-bearing wooden construction of suspended vented façade:

Installation of primary grid – horizontal laths
Fix the wooden laths with dowels to a levelled base for corresponding stability of the resulting load-bearing construction. When selecting the type and size of the dowels the fittingness of the base must be considered. If the base is not sufficiently flat put wooden pieces under the laths to achieve local and overall planarity. To level the individual surfaces place vertical wooden laths along their edges first. Nail the laths and stretch a line between them.
Now the front plane of the wooden grid is specified. The other horizontal laths must be aligned to this plane with the help of wooden pieces or cutting into the wall. Afterwards tighten the laths.

Heat insulation layer assembly
For heat insulation first fix the horizontal laths to the base (lath thickness to be identical with the insulation thickness). Then place lengthwise heat insulation and fix to the base with disc dowels. The heat insulation layer is fixed with disc dowels pursuant to the requirements of the anchoring technology manufacturers. The number of the disc dowels is to be specified by the designer on the basis of recommendations of the heat insulation material manufacturers.
The heat insulation layer must adhere to the base, must be continuous without open joints (the individual parts must be placed tightly side by side!). The disc dowels must be firmly fixed to the base and must be tightened to the heat insulation layer.

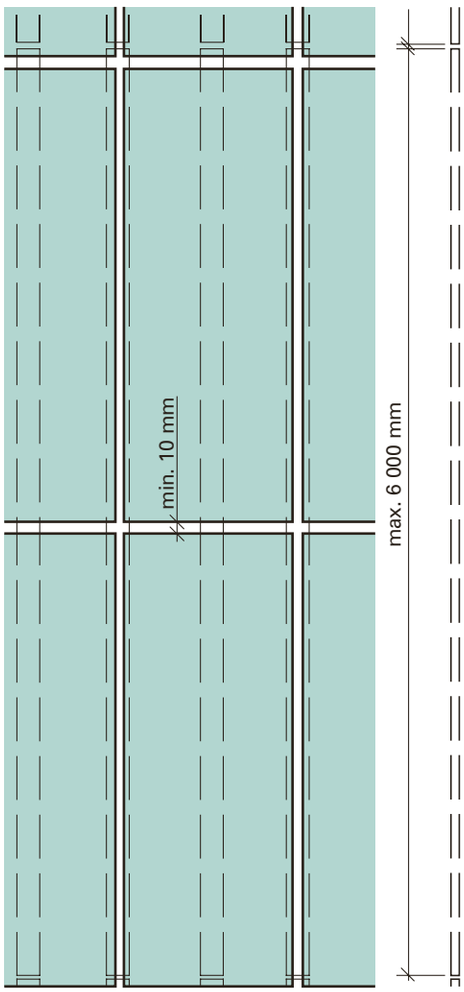
Installation of secondary grid – vertical load-bearing laths
Vertical load-bearing laths (minimum width 50 mm, or min. 100 mm in the points of contact between two boards) are fixed with screws to the primary grid. The axial distance between the laths must not exceed the specified values. After fixation of the vertical laths the grid will include an air gap with a minimum width of 25 mm and a maximum width of 50 mm.

Installation of auxiliary constructions
The auxiliary constructions are installed pursuant to the requirements of the detail drawings included in the manufacturing documentation. They mainly include auxiliary vertical and horizontal laths defining openings (jambs and heads of windows and doors), inner and outer corners, bottom and top lining etc.

Maximum length of wooden lath grid is 6 m. Wooden elements must be dried and treated against humidity, insects and ligniperdous pests. In the case of a combined grid, anchors must be placed on both sides of the wooden laths alternatively (for reduced twisting).

The minimum dilation between the laths in the places of horizontal joints must be 10 mm. Stainless anchoring material is recommended for joining.

Dilations – wooden grid



8.8.2 Assembly of Aluminium or Zinc-Coated Load-Bearing Construction

Regarding the high thermal expansion the **grid of aluminium profiles** is only made of L profiles, i.e. the vertical contact between boards is always made of **two separate L profiles**.

When assembling the grid of **zinc-coated profiles** it is acceptable to use a **joint profile** for CETRIS® board laying in widths of **up to 1,875 mm**. **In the case of wider boards** (lengthwise laying) the procedure will be the same as in the case of aluminium sub-construction, i.e. **instead of a joint profile use two separate L profiles**.

The maximum length of an aluminium and zinc-coated profile grid is 3.35 m. The minimum dilation between profiles in the place of horizontal joints must be at least 10 mm. The load-bearing grid (fixation and spacing of anchors, profile anchoring – fixed and slide points etc.) must be assembled pursuant to the instructions of the grid supplier. All joining materials for aluminium grids must be stainless.

Fixation of a CETRIS® board to two different grids (different materials or different dilation units) is not permitted!

Correct assembly of L profiles in the place of vertical joint

Diagram of aluminium L profile installation

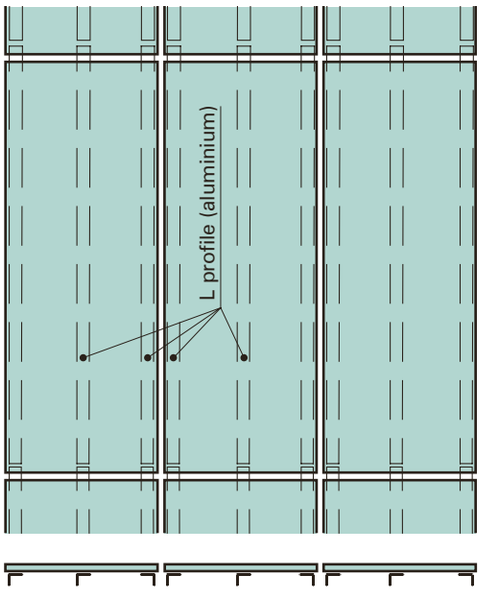


Diagram of profile installation for board widths > 1,875 mm

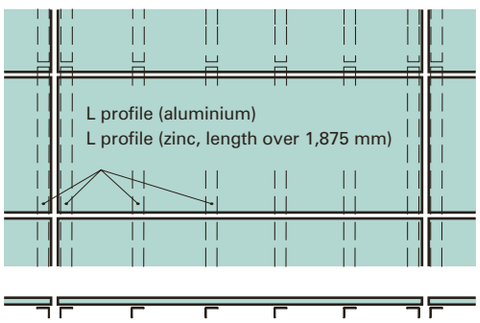
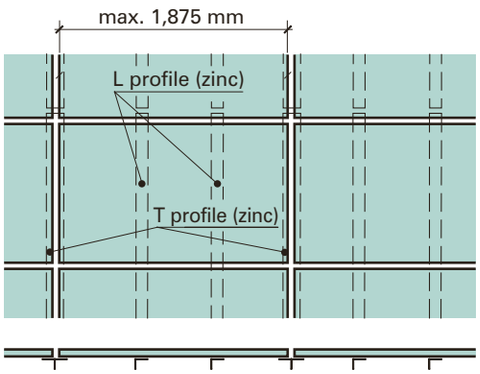
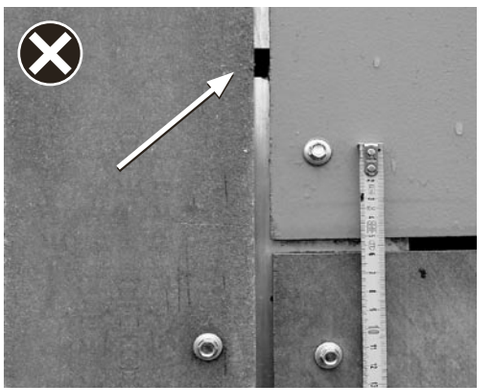


Diagram of zinc-coated profile installation for boards widths > 1,875 mm



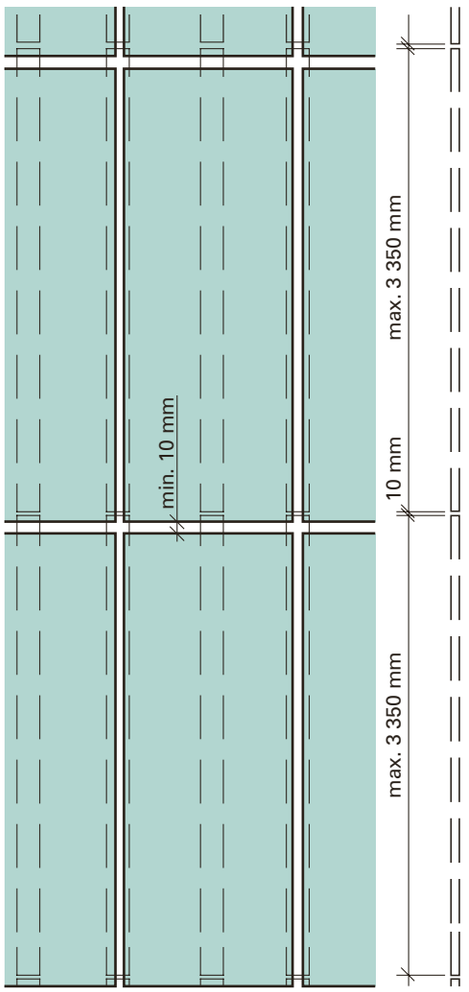
Exceeded support spacing
Insufficient anchoring of CETRIS® boards (exceeded maximum spacing of profiles and screws) causes deformations (bulging or swelling) or board damage (cracking)!



Incorrect grid dilation
Incorrect profile dilation off the horizontal joint level between CETRIS® boards.

Unlevelled board base
When using auxiliary profiles (corner, joint fills) the surface must be levelled along the profile height.

Dilation – grid of aluminium or zinc-coated profiles



Correct use of rubber tape
For base levelling and board dilation facilitation, a rubber EPT tape must be placed under the CETRIS® boards. The tape will prevent the immediate transfer of heat, humidity and potential corrosion dripping (zinc-coated grid).

8.8.3 Assembly of DEKMETAL Load-Bearing Construction

Assembly of the façade system onto a DEKMETAL load-bearing construction may be divided into the following steps:

- Horizontal grid formation
- Thermal insulation assembly
- Diffusion foil fixation
- Vertical profile assembly
- Assembly of façade cladding itself including detail solutions

The first two steps depend on the type of the base construction – whether it is a skeleton with C cassettes used or a wall with brackets and profiles used. Further steps are identical.

The first step of the façade system assembly includes creation of the horizontal part of the grid. If the load-bearing construction is of the skeleton type then C cassettes are used. If the façade cladding is installed to a load-bearing wall then the grid consists of a system of brackets and Z50 profiles.
The following text describes the more common assembly variant – on a brick or concrete wall. The procedure of assembly over C cassettes (assembled base construction) is available from the system supplier.

The DEKMETAL load-bearing system is governed by the same principles for the vertical profile and anchoring element spacing – see tables Maximum Axial Distances of Anchoring Elements in chapters 8.3 CETRIS® VARIO façade system and 8.4 CETRIS® PLANK façade system.

Tools
The following tools are used for assembly of the DEKMETAL façades:
- Tighteners – electrical with deep stop and tightening torque. Deep stop is usually used for assembly of the steel construction itself. The tightening torque is applied to anchoring bolts.
- Electrical cutting shears – used for lacquered sheet metal cutting. The shears make straight and curved cuts. They may even cut bent sheets with a special type of cutting head.
- Manual or electrical metal saw – manual saw suffices for minor works. Electrical saw is recommended for longer cuts.
- Riveting tongs – for minor riveting works such as riveting of gutters manual riveting tongs are sufficient.
- Sheet cutting shears. For adaptations of thicker sheets (above 1 mm) lever shears are recommended. Always use a set of left and right shears.
- Folding pliers – for manual folding works two types of folding pliers are used – straight for sheet folding and curved for groove making.

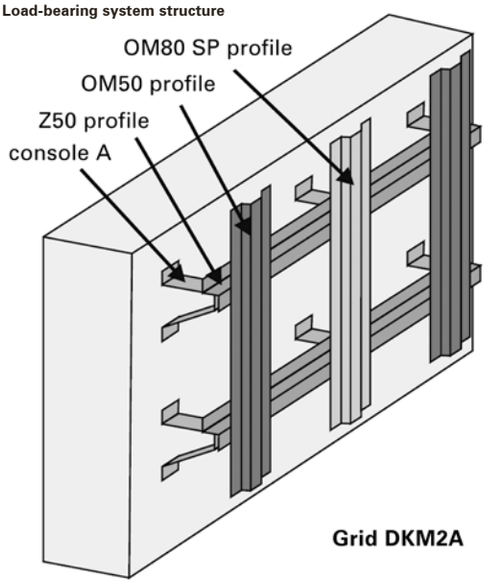
STRUCTURE TYPE	ON SILICATE WALL	ON C CASSETTE WALL (ASSEMBLED CONSTRUCTION)
Load-bearing base	Brick concrete wall	Load-bearing C-cassettes
Fixation to base	DEKMETAL brackets	
Horizontal line elements	Z50 Profile	
Oblique line elements	Z50 Profile	Z50 Profile
Vertical line elements	Omega 50 (80) Profile	Omega 50 (80) Profile
Cladding element	CETRIS® FINISH, FINISH PROFIL, thickness max. 16 mm	

- Fixation pliers – for temporary fixation of sheets. Measuring equipment – meters, bands, plummets, levelling instrument, theodolite.
- Resawing laser
- Drill.

Assembly of Horizontal Line Elements of Grid – Brackets and Z 50 Profiles
For point anchoring to continuous base (brick or concrete wall) there are brackets with pre-drilled holes marked in the drawing documentation. Check the planarity of the existing façade before assembly commencement. Find out the most bulging place of the façade and the difference between the bulge and the façade corners.

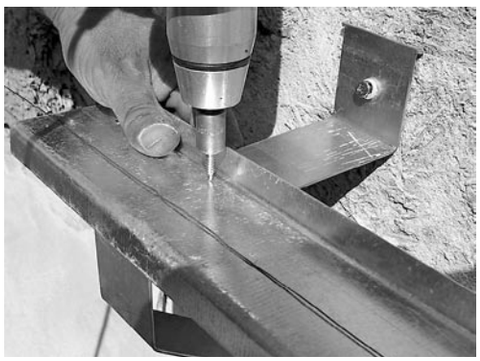
Use the anchoring plan to mark the bracket rows. Mark the bottom row with the foundation L profile with a levelling instrument, and measure the remaining rows with a tape measure. Connect the end points with a colour string and mark the rows on the façade. Use the anchoring plan to fix the brackets to the drawn rows. Fix every bracket with the designed anchoring bolts. After fixation of the end anchors use the plummet to mark the vertical. The vertical should be placed about 2 cm behind the anchor fronts. Join these points in the horizontal direction with a tie wire. Thus the perfectly planar grid has been marked for installation of Z 50 profiles. If you can use a rotary laser, use it for the plane marking instead of the ropes.

Load-bearing system structure



Z 50 profiles are fixed to the suspended brackets with self-cutting screws. Place the Z 50 on the suspended brackets, check their correct positioning in relation to the tie wire and screw to each suspended bracket with one screw. The distance of the front belt of the Z50 profile must not be more than 30 mm away from the anchor front.

Installation of Z50 profile on anchor



Use of rectification profile

If the façade roughness exceeds the levelling limits of the Z50 profile, a U shaped rectification profile must be used. Place the profile on the horizontal surface of the bracket to support the Z profile and screw to the bracket with two bolts. Then place the Z50 to the rectification profile and screw the two profiles together.
The Z50 profiles are connected by overlaps of 100 mm, screwed in the overlapped sections with two self-cutting screws. One in the leg and the other in the front belt. The screws should be placed diagonally in relation to the overlapping sections.
If connecting profiles join at the outer corner of the object, screw them together or bend the profile to form the L shape and connect to the other profiles. Inner corner profile connections are made in a similar way.

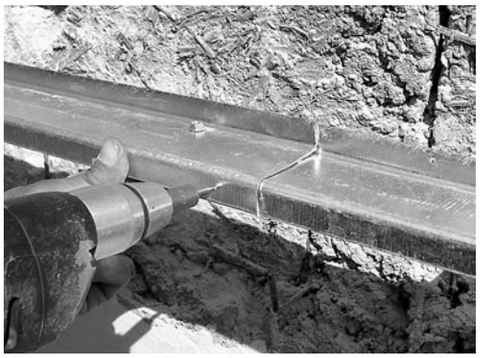
In the course of the horizontal grid assembly place the first part of the foundation profile to the wall base. The base moulding detail is implemented before assembly of the individual cladding elements of the façade system. Sufficient attention must be paid to correct marking and assembly of the moulding elements for they will define the basic foundation level of the whole cladding. In the course of assembly of the Z50 profiles, anchor the L shaped foundation profile to the wall. Place the anchoring elements with the spacing of 500 mm. The position of this element creates the foundation plane for all cladding elements. The element must be installed horizontally at the height defined by the laying plan. Together with the n profile assembly fix the second part of the foundation profile to the wall base. Level the profile on both ends with the omega profiles, check planarity and fix with fixing pliers. Screw both parts of the foundation profile from the bottom with the spacing of 500 mm. After that draw the diffusion foil between the foundation profile and screw together the omega profiles.

After fixation of the omega profiles fix the L shaped venting lath. The lath end should touch the gutter nose of the foundation profile. The lath position can be seen in the detail drawing. Fix the laths with screws or rivets.

Safety Hydro Insulation and Air Tight Layer Effectively Permeable for Vapour
The contact diffusion foil with equivalent diffusion thickness below 0.3 m performs several functions in the façade structure:

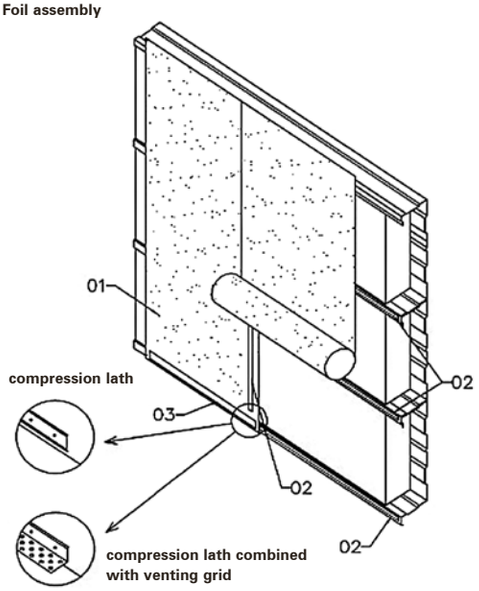
- **Safety hydro insulation** – cladding of CETRIS® boards is not perfectly water-tight. Precipitation water in liquid state gets into the construction through small gaps between the individual elements of the coat. Near through passes and openings for the façade venting wind blown snow gets in.
- **Air tight layer** – prevents infiltration. The well joined and worked layer prevents air penetration between the interior and the exterior (especially through details). In the structures with C cassettes air tightness of this layer is a must (the only air tight layer in the structure).
- **Protection of heat insulation against surface cooling** – in the areas of inlet and outlet openings there is the risk of the cold exterior air blowing in the fibres of thermal insulation with short-term reduction of their effectiveness.
- **Protection of heat insulation against dust** – heat insulation properties may also be impaired by dust deposits on the heat insulation fibres. The rate and level of effectiveness decrease depends on the exposition level – that is on the building location.

Connection of Z50 profiles, overlap 100 mm



The foils are supplied by their manufacturers with suitable adhesive tapes for joint gluing and detail lining. The foils are fixed to the wall in vertical strips. First fix the two-sided adhesive tape on the Z50 profile belts or C cassettes (polyethylene or butyl-rubber tapes are the most common types used). Roll the foil along the heat insulation and fix the foil to the tape. Anchor the foil by the wall base with a compression lath. Then install the vertical profiles. Timely installation of these elements will prevent the risk of the foil tearing off because of wind. The following strip is laid in the same way with the overlap prescribed by the manufacturer. Fix the foils with the tape in the places of their overlaps.

Foil assembly



Assembly of Vertical Omega Profiles
Vertical omega profiles are used for definition of the air gap and for creation of the base for the cladding element assembly.
The DEKMETAL portfolio includes two types of these profiles – omega 50 with a 50 mm inside belt width and omega 80 with an 80 mm belt width. The invisible profiles are made of zinc-coated steel. The visible profiles may be painted with a polyester paint.
Use of the individual profile types is defined in the laying plan and assembly principles for CETRIS® boards.

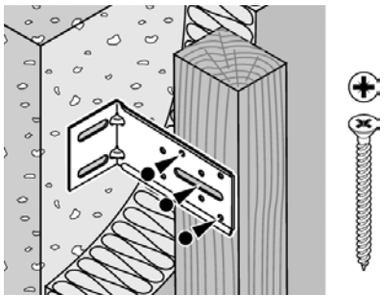
Before starting the assembly first measure and divide the whole wall and check the actual data against the drawing documentation. Mark the position of the omega profile in the middle of the wall. When assembling the first profile make sure it is vertical. Fix the profile in the bottom part with the fixation pliers and screw to the Z profile belt (or to the C cassette) with one screw. Check the verticality of the profile with a spirit level and plummet if necessary and screw it in. Fix the following omega profile with an overlap of 100 mm, and screw the ends with two screws. Check the verticality of the first row after every element assembly using the plummet.
Continue with the omega profile assembly from the middle row. Use spacing laths for maintaining a constant distance.

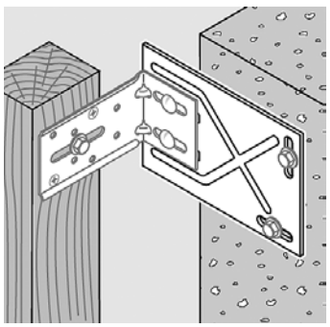
Technical service in the areas of design, supply and assembly of this load-bearing construction is provided by the supplier DEKMETAL s.r.o.

8.8.4 ETANCO Load-Bearing Construction

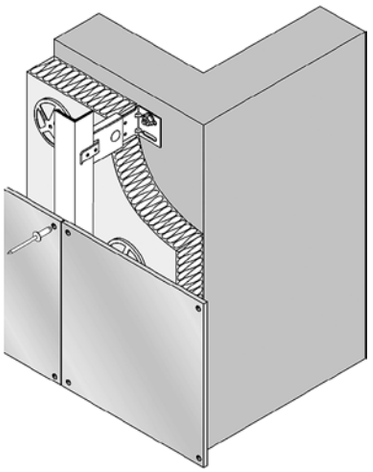
The company ETANCO CZ s.r.o. supplies anchoring (fixation) elements and anchoring technology for civil engineering, especially in specific sectors such as façade and roof cladding, cladding of vented façades, flat roofs etc. The company also provides technical service in the areas of design, supply and assembly of this load-bearing construction.

Combined Load-Bearing Construction – Wooden and Metal Elements
Used for cladding up to 9 m high without limitations, and in the case of higher buildings on the basis of individual assessment of the whole composition with a view to the requirements of ISO 5658-4 for vertical flame spread. The main advantage is variability and affordable pricing.

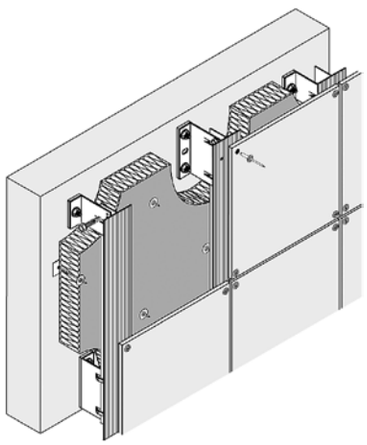




Steel Construction
No limitation of maximum height by fire protection regulations. The main advantage is affordable pricing. The design and assembly of the façade boards on the construction must provide for sufficient board and grid profile dilation (max. 3.35 m).
The basic system element of the combined and steel construction are pressed reinforced anchoring brackets of galvanised steel Z 350 – ISOLCO 3000P for vertical grids and BRACKETS for horizontal grids connected with the L construction profile.



Aluminium construction
Its advantages include quick and easy assembly. Zinc-coating or other protection not needed. Lower weight (in comparison to steel) allows for suspending higher weights on the construction or reduction of the spacing and thus the number of anchors.
The design and assembly of the façade boards on the construction must provide for sufficient board and grid profile dilation (max. 3.35 m). The aluminium construction system Façalu LR 110 consists of an ISOLALU wall L piece. These pieces are made in ten different lengths and may be regulated within the range of 68 – 278 mm.
The main element of the grid is represented by three basic aluminium profiles – T, L and Omega. The system also includes polypropylene pressed washers preventing thermal bridge between the load-bearing construction and the L piece.



8.8.5 Assembly of CETRIS® Façade Boards

Installation of CETRIS® boards – VARIO system (visible joints)
Before the board installation, mark the basic horizontal plane (pursuant to the manufacturing documentation).

The basic horizontal plane is usually defined by the:
- Bottom edge of the second horizontal row of CETRIS® cement bonded particleboards
- Level of window and door sills if the board joints follow this level
- Level of window and door transoms if the board joints follow this level
- This horizontal plane subsequently determines all of the perimeter of the building.

If the project defines more height levels of the coat the other horizontal axes must also be marked in this step pursuant to the manufacturing documentation (the axes are always defined by the bottom edge of the first row of the CETRIS® cement bonded particleboards) for these levels (ideally with a laser). Place the boards side by side with the visible horizontal and vertical joints with the minimum width of 5 mm. CETRIS® cement bonded particleboards are connected visibly with screws or clamps or invisibly with SikaTack glue.

The predrilled holes and joining elements must be placed on the board in prescribed distances (see page 1). When anchoring a board, first fix the fixed point (depending on the size and shape of the board the fixed points are one or two – as close as possible to the board centre). After that, anchor all the slide points, ideally in the clockwise direction.
The screw tightening torque must be preset to prevent deformation of the screw washer or CETRIS® board. The screw (rivet) must be placed in the middle of the predrilled hole perpendicularly to the board plane. When riveting, the slide joint must be achieved with a distance extension of about 1 mm.

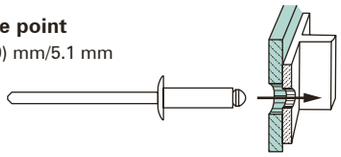
Installation of CETRIS® Boards – PLANK System (Overlapped Horizontal Joints)

Before the board installation, mark the basic horizontal plane (pursuant to the manufacturing documentation). The basic horizontal plane in the overlapped system is defined by the upper edge of the first horizontal row of the CETRIS® boards. This plane subsequently defines the whole perimeter of the building. As the boards are laid with overlapped horizontal joints the needed number of boards and their overlaps must be determined.

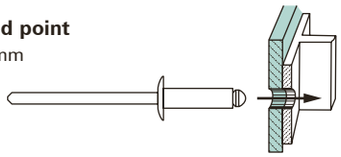
Number of boards: $N = 1+(H - 300)/250$
Board overlap: $O = (N \times 300 - H)/(N - 1)$

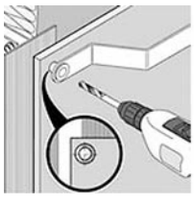
where:
N – number of boards in pieces
H – façade height in mm
O – board overlap in mm, at least 50 mm
300 – CETRIS® PLANK board width in mm
250 – visible width of CETRIS® PLANK board in mm

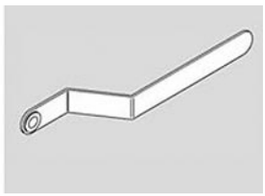
Slide point
8 (10) mm/5.1 mm



Fixed point
5.1 mm



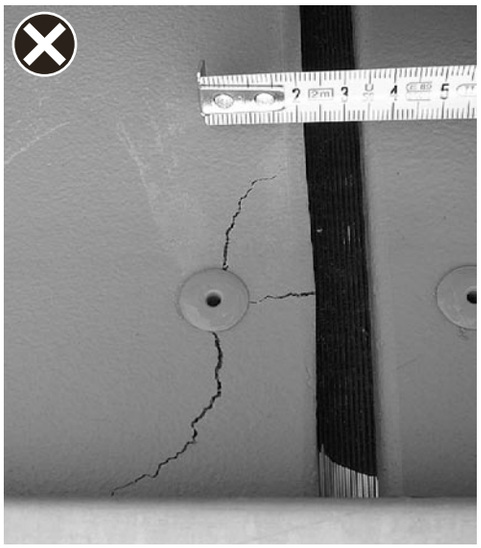




Begin the board assembly from the bottom by placement of a strip on the basic horizontal plane with the same thickness as the CETRIS® board and the width corresponding to the calculated overlap. Cover the strip with the first row of the cladding boards, width 300 (200) mm.

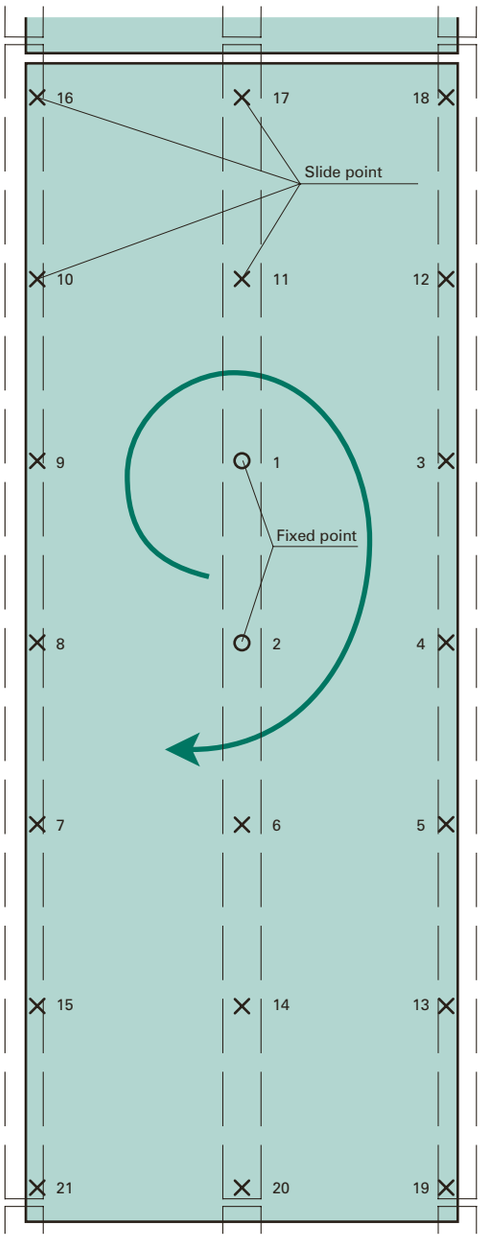
Place the joining elements to the upper edge of the boards (40 mm from the upper edge, 35 mm from the vertical edge). The screws may only be tightened so they do not deform the façade element and to prevent volume changes of the board. The first row of the cladding boards must be properly leveled to prevent later complications. Before placement of every row of the cladding boards apply the flexible glue under the upper edge of the already fixed boards (cakes with the diameter of about 20 mm with the spacing of approx. 300 mm).

The vertical joints of the boards must be supported and their **width must be at least 5 mm**.



Distance of the side rivet from the edge too small.

Anchoring procedure



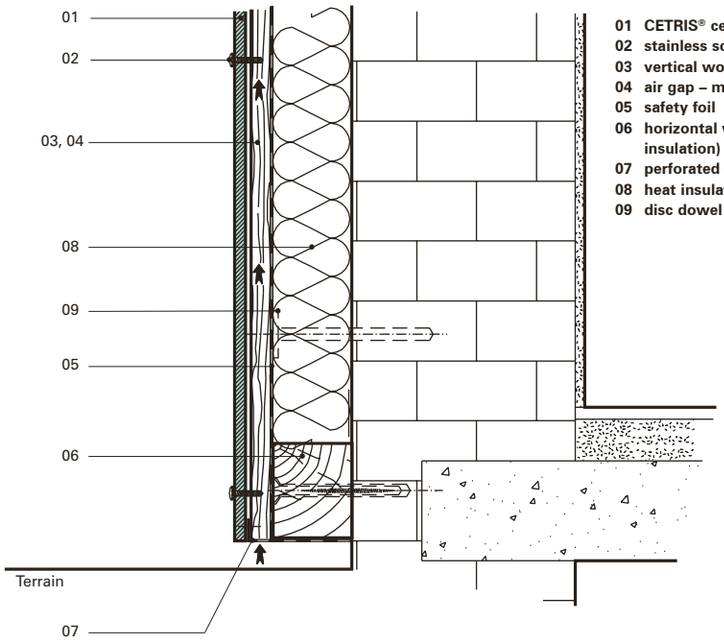
8.8.6 Detail Implementation of CERTIS® Façade Systems

The process of assembly of details of the suspended façade coat is designed individually on the basis of the design of the details in the relevant manufacturing documentation drawings. The recommended solutions of these details are shown in figures (on pages 22 – 41).

Note: The drilling and cutting (or milling) of CETRIS® cement bonded particleboards is only possible with tools of hard metal designed for this type of cut. Where anchoring element penetration is required (for example for exterior lighting of the building, for installation of signs and advertising panels etc.) sufficient dilation of the coat and these anchoring elements must be provided for, i.e. the holes for these elements must be at least 15 mm larger than the largest size of the anchoring element. To restore the surface finish of the visible edges use the paint supplied for this purpose with every order. Assembly of other constructions (such as advertising signs) directly to the suspended façade coat is only possible as an exception on condition of static assessment and solution of joint forces from these constructions and from the coat with regard to thermal expansions of the individual materials.

Detail of bottom lining with overlap. CETRIS® board on wooden grid, VARIO system

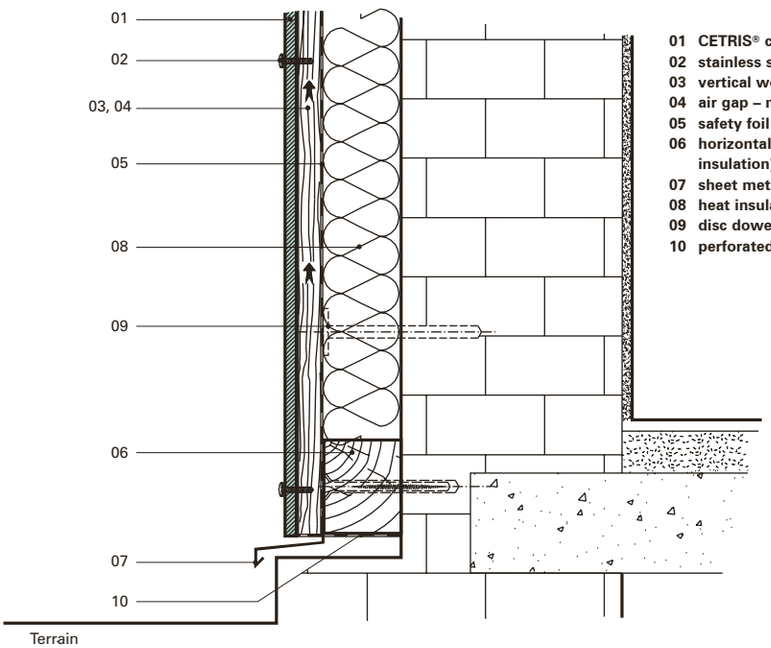
Vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 perforated venting profile (PROTECTOR)
08 heat insulation
09 disc dowel

Detail of bottom ending with sheet metal cladding. CETRIS® board on wooden grid, VARIO system

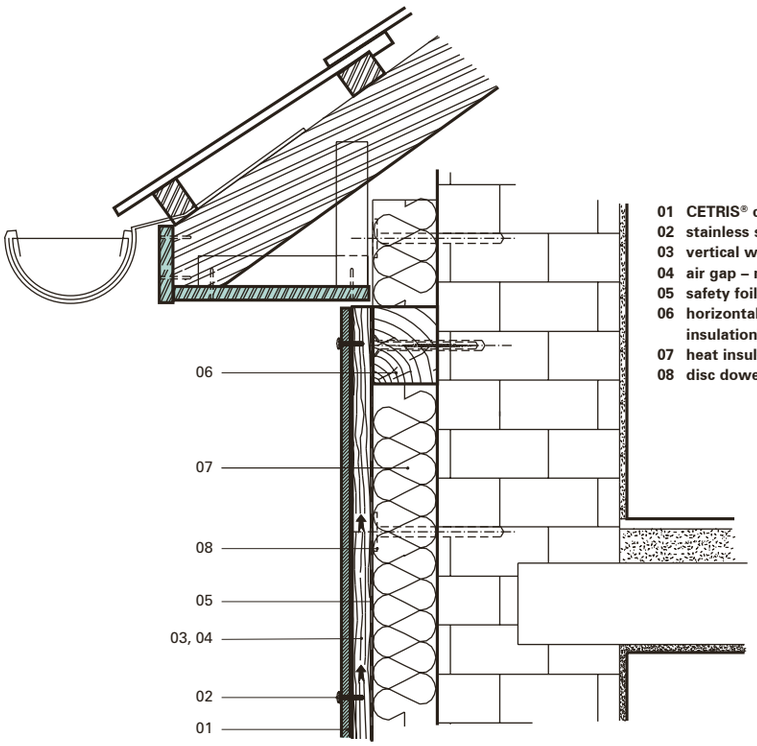
Vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 sheet metal cladding – metal product
08 heat insulation
09 disc dowel
10 perforated venting profile (PROTECTOR)

**Detail of upper lining with roof construction overlap.
CETRIS® board on wooden grid, VARIO system**

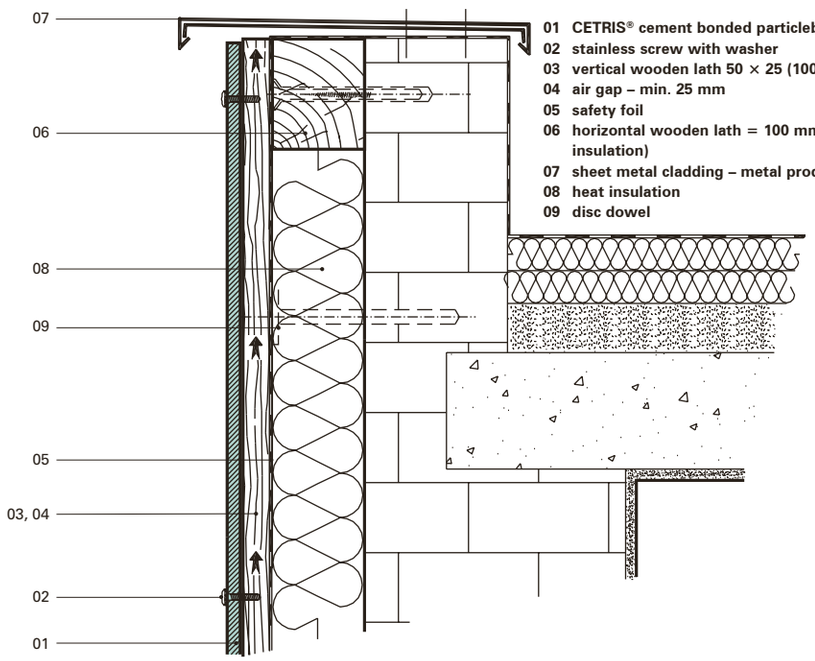
Vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 heat insulation
08 disc dowel

**Detail of upper ending with attic.
CETRIS® board on wooden grid, VARIO system**

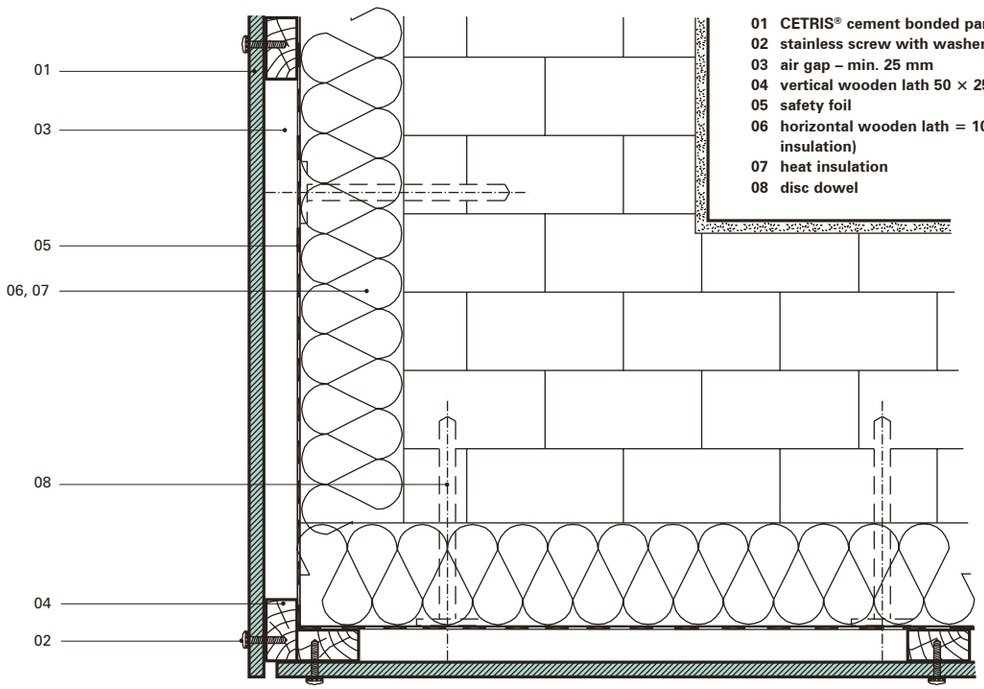
Vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 sheet metal cladding – metal product
08 heat insulation
09 disc dowel

Detail of exterior corner. CETRIS® board on wooden grid with overlap, VARIO system

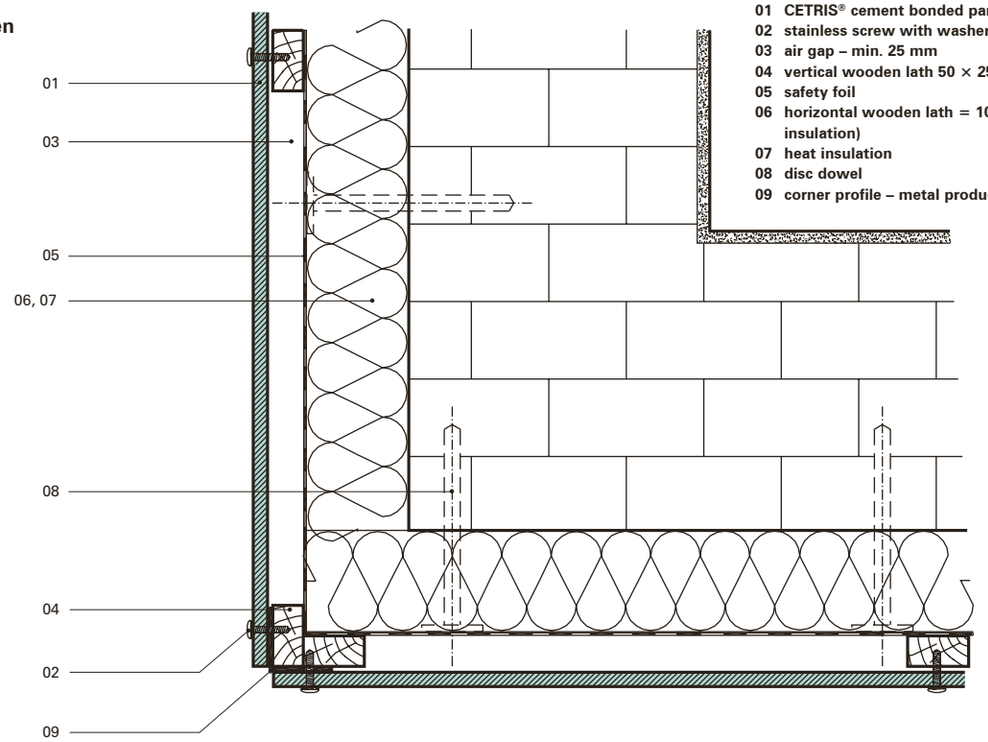
Horizontal section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 heat insulation
08 disc dowel

Detail of exterior corner. CETRIS® board on wooden grid with corner profile, VARIO system

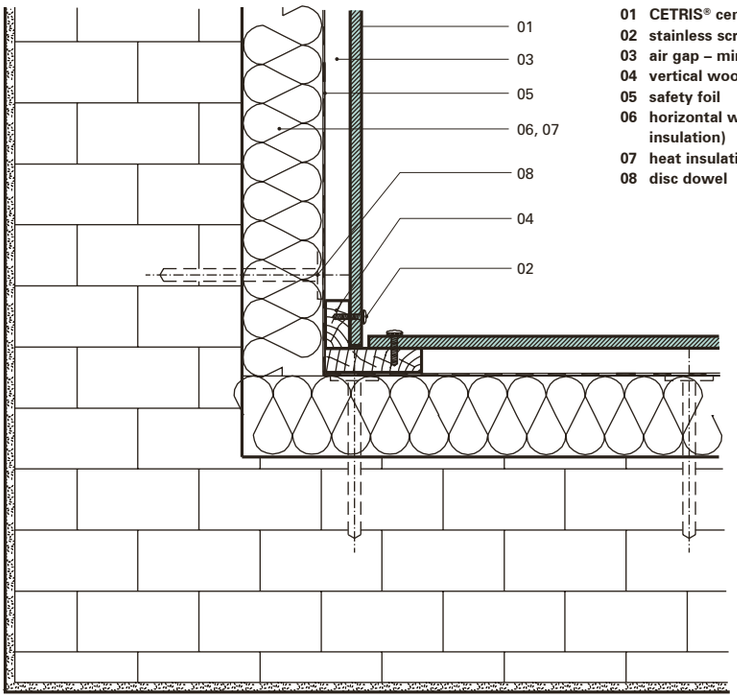
Horizontal section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 heat insulation
08 disc dowel
09 corner profile – metal product, or PROTECTOR profile

Detail of interior corner. CETRIS® board on wooden grid with overlap, VARIO system

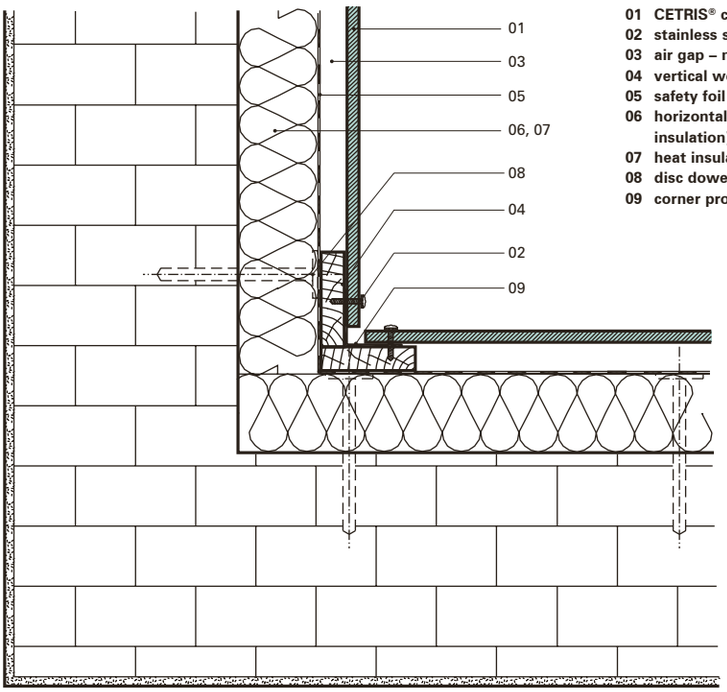
Horizontal section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 heat insulation
08 disc dowel

Detail of interior corner. CETRIS® board on wooden grid with corner profile, VARIO system

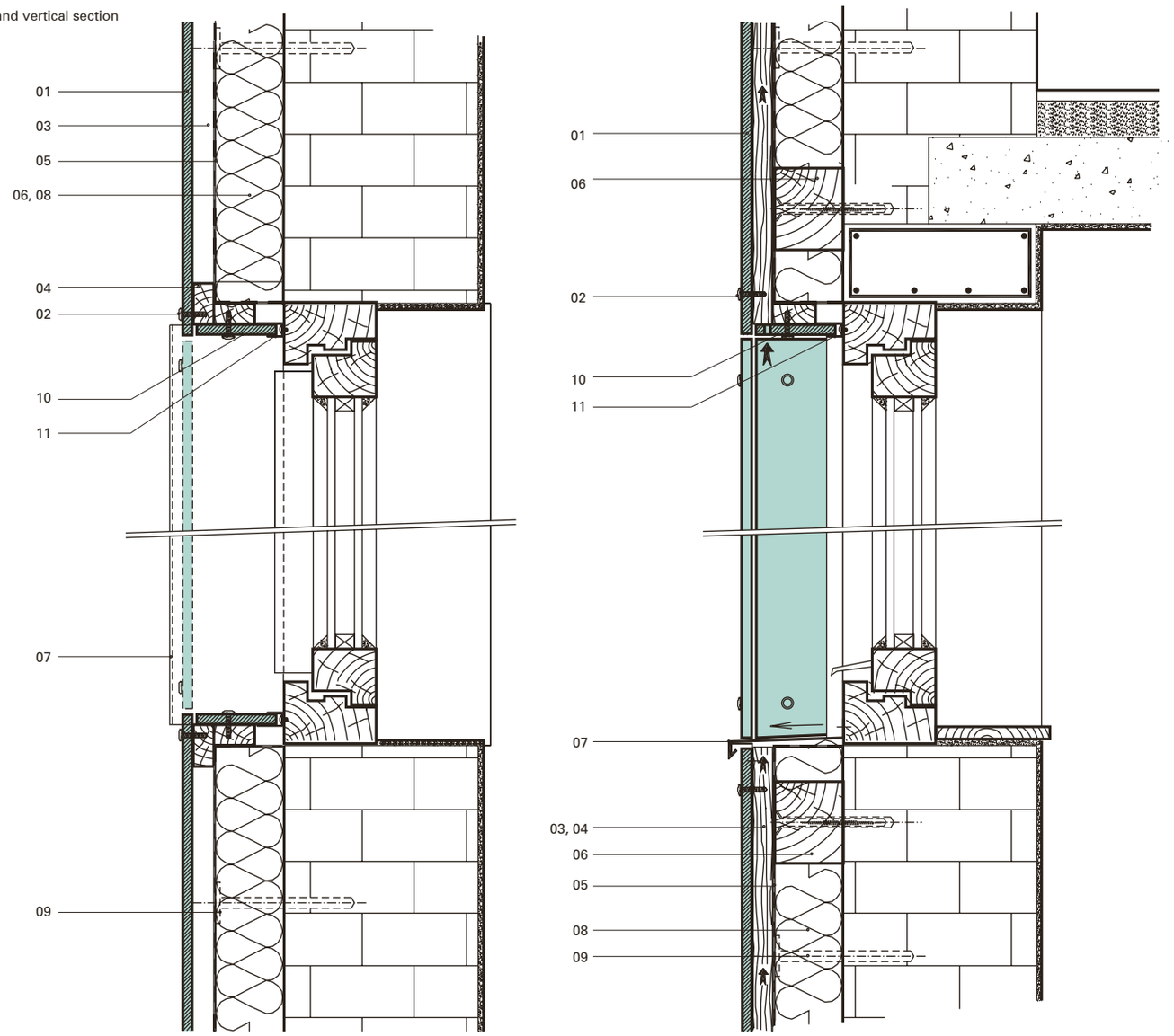
Horizontal section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 heat insulation
08 disc dowel
09 corner profile – metal product, or PROTECTOR profile

Detail of jamb and window head of opening, CETRIS® boards on wooden grid, VARIO system

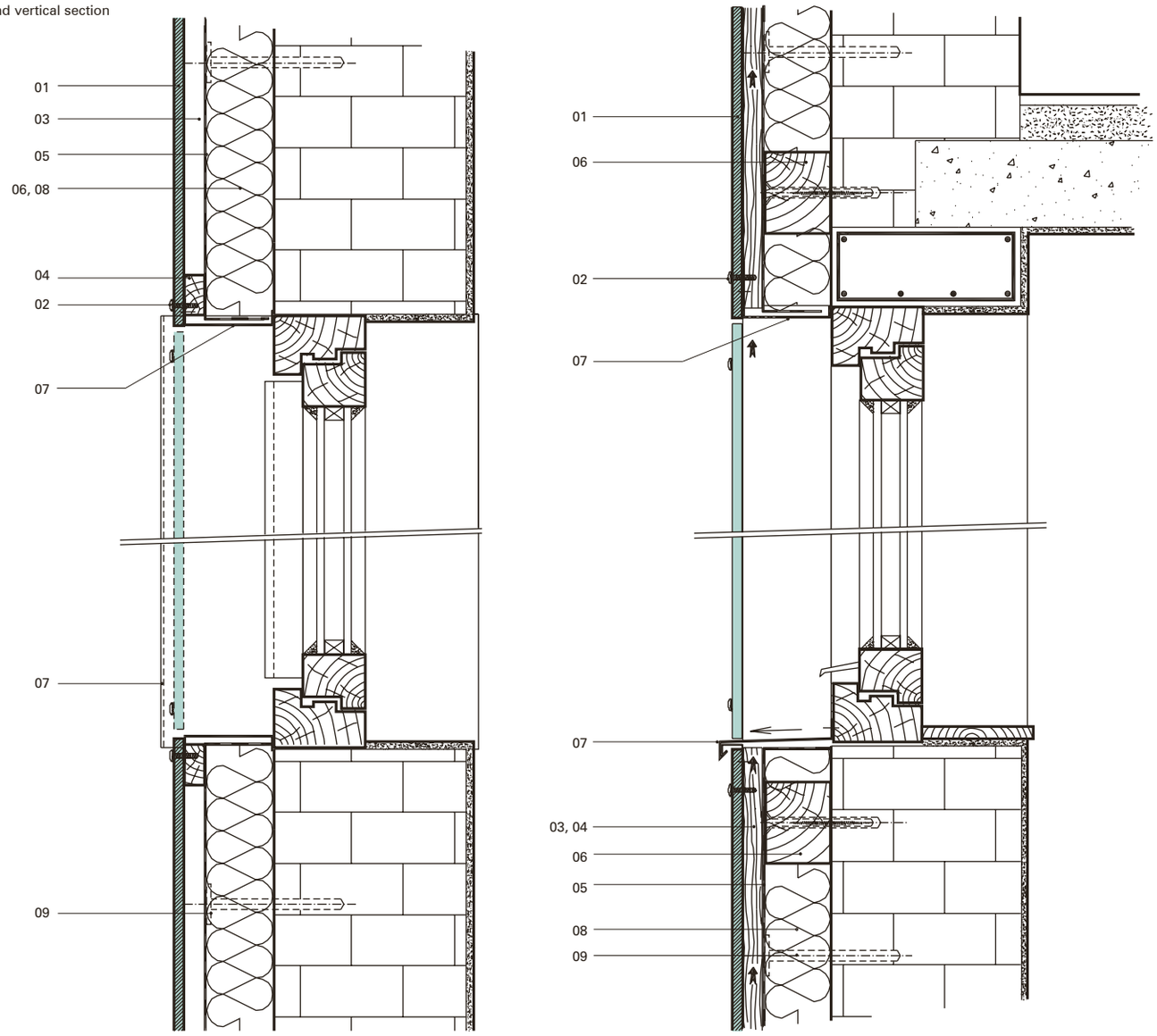
Horizontal and vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 sheet metal cladding – metal product
08 heat insulation
09 disc dowel
10 door head – perforated CETRIS® board
11 end profile

Detail of jamb and window head with sheet metal cladding of opening, CETRIS® boards on wooden grid, VARIO system

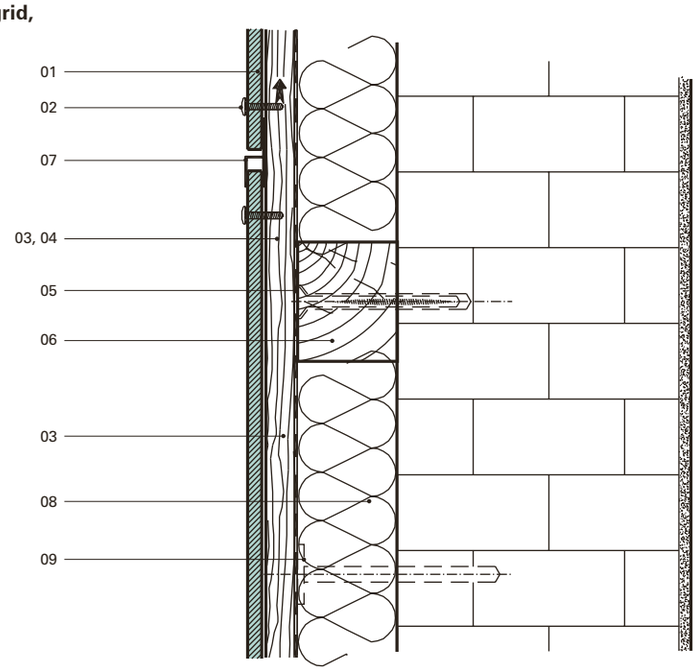
Horizontal and vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 sheet metal cladding – metal product
08 heat insulation
09 disc dowel

**Detail of horizontal joint.
CETRIS® board on wooden grid,
VARIO system**

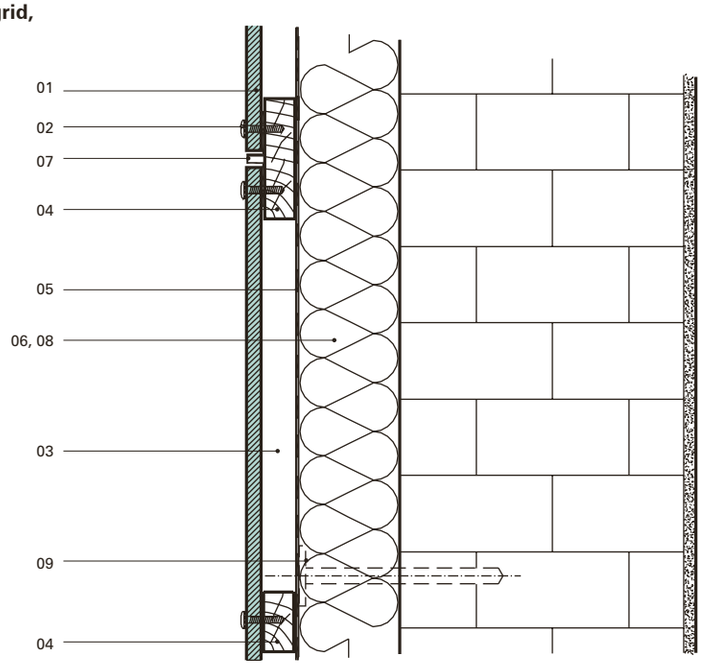
Vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 profile in joint – metal product, or profile PROTECTOR
08 heat insulation
09 disc dowel

**Detail of vertical joint.
CETRIS® board on wooden grid,
VARIO system**

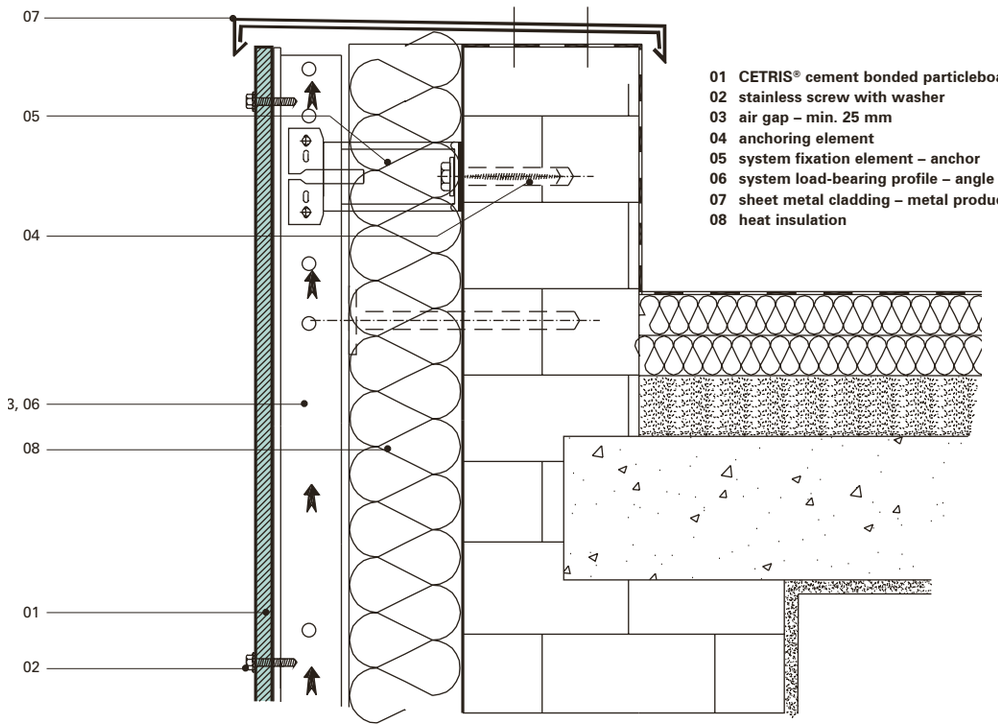
Horizontal section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 profile in joint – metal product, or profile PROTECTOR
08 heat insulation
09 disc dowel

Detail of upper ending with attic. CETRIS® board on system profiles, VARIO system

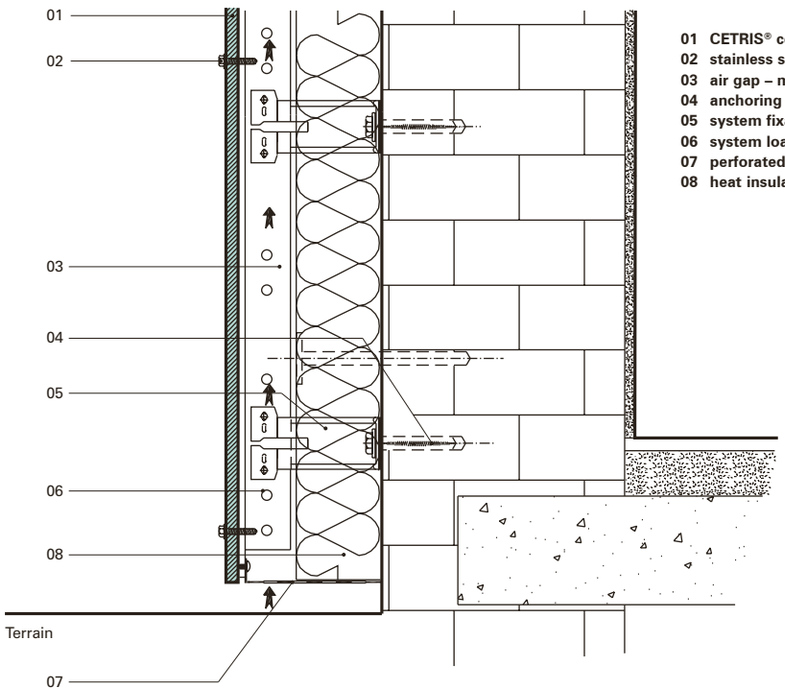
Vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile – angle piece
07 sheet metal cladding – metal product
08 heat insulation

Detail of bottom ending with overlap. CETRIS® board on system profiles, VARIO system

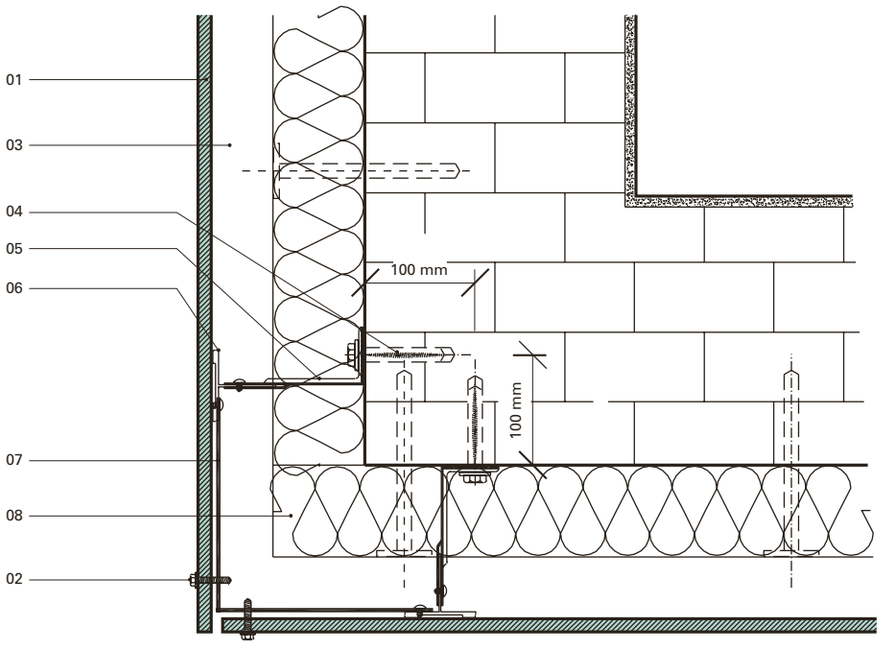
Vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile – angle piece
07 perforated venting profile (PROTECTOR)
08 heat insulation

Detail of exterior corner. CETRIS® board on system profiles, VARIO system

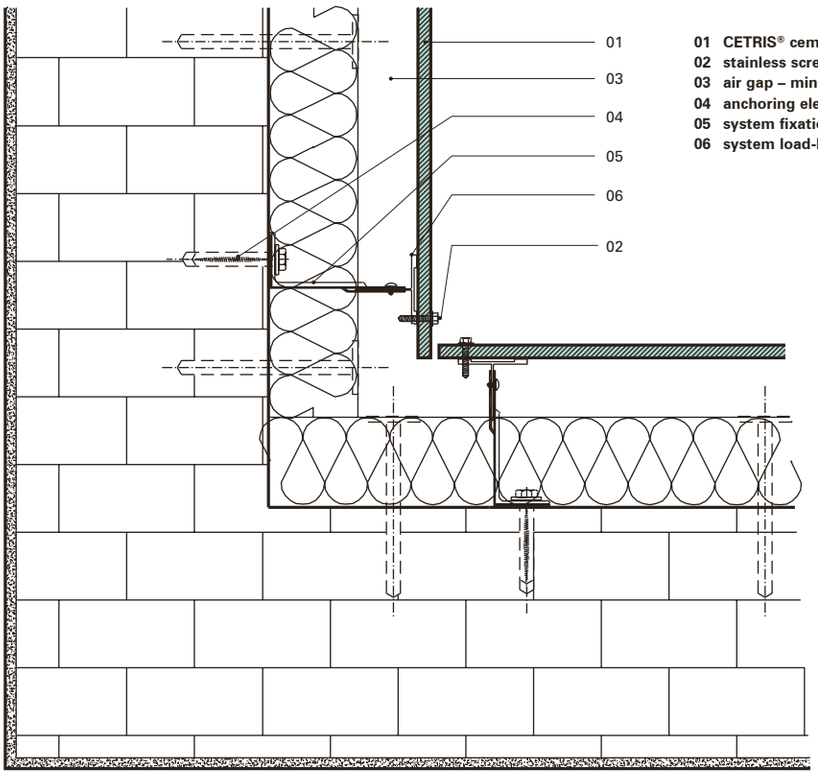
Horizontal section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile
07 aluminium L profile (500 mm)
08 heat insulation

Detail of interior corner. CETRIS® board on system profiles, VARIO system

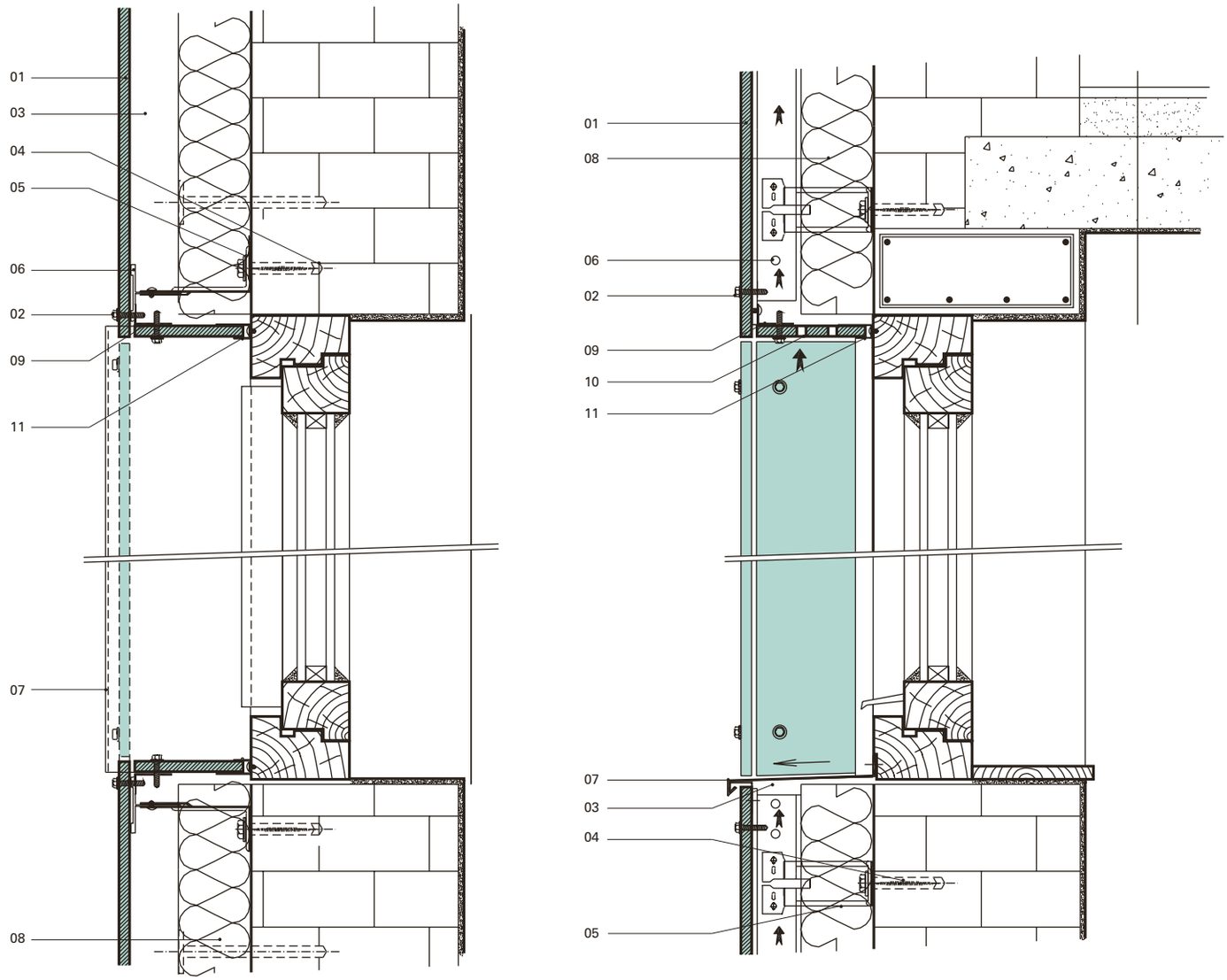
Horizontal section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile

Detail of jamb and window head of opening, CETRIS® boards on system profiles, VARIO system

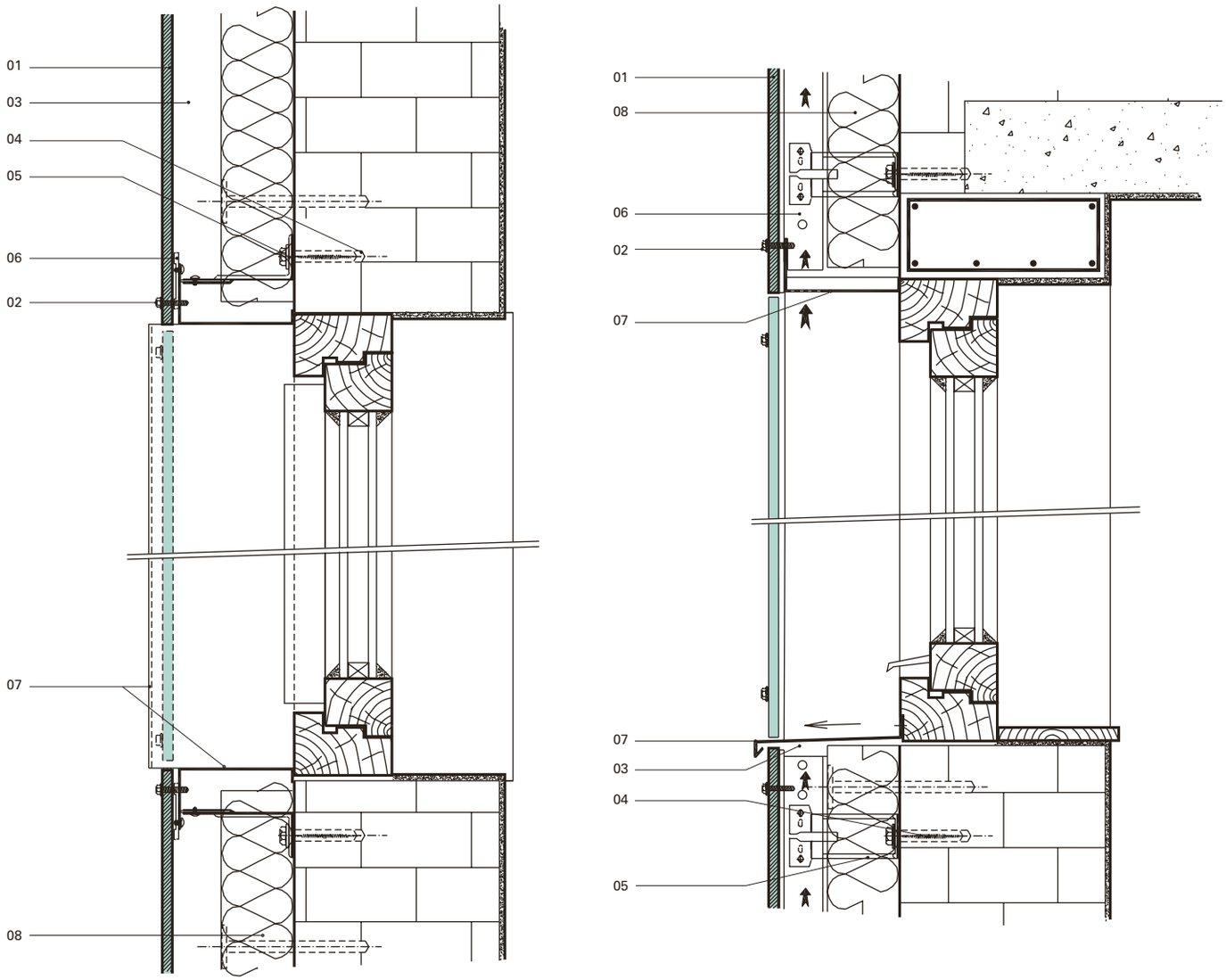
Horizontal and vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile
07 sheet metal cladding – metal product
08 heat insulation
09 aluminium L profile
10 window head – perforated CETRIS® board
11 end profile

Detail of jamb and window head with opening sheet metal cladding of the opening, CETRIS® boards on system profiles, VARIO system

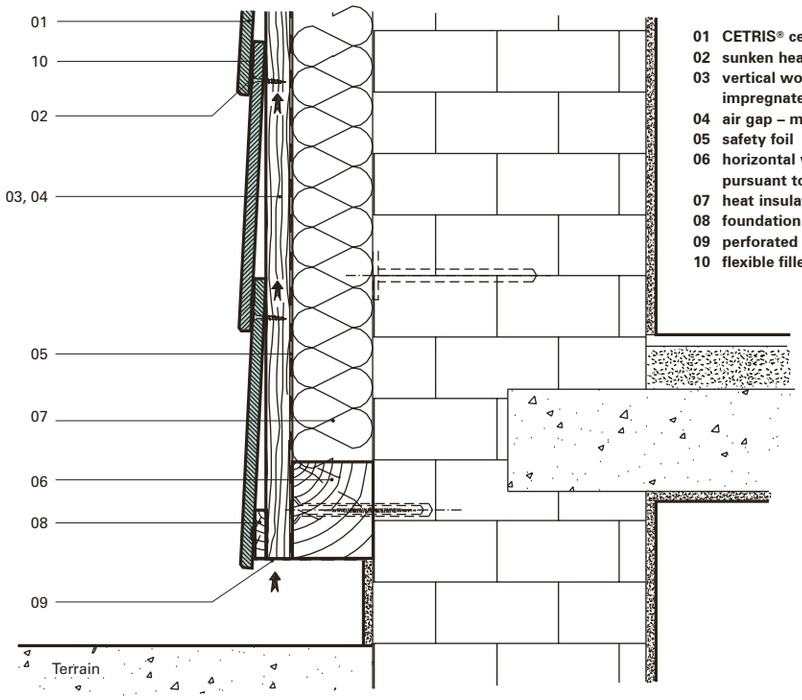
Horizontal and vertical section



01 CETRIS® cement bonded particleboard
02 stainless screw with washer
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile
07 sheet metal cladding – metal product
08 heat insulation

**Detail of bottom ending.
CETRIS® board on wooden grid,
PLANK system**

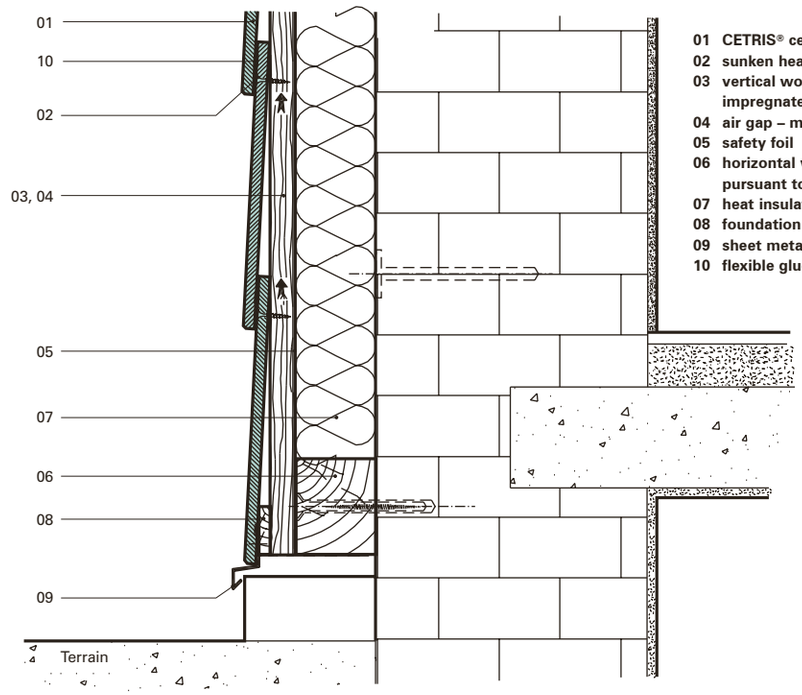
Vertical section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath 100 mm (thickness pursuant to insulation)
07 heat insulation
08 foundation slab
09 perforated venting profile (PROTECTOR)
10 flexible filler

**Detail of bottom ending with sheet metal cladding.
CETRIS® board on wooden grid,
PLANK system**

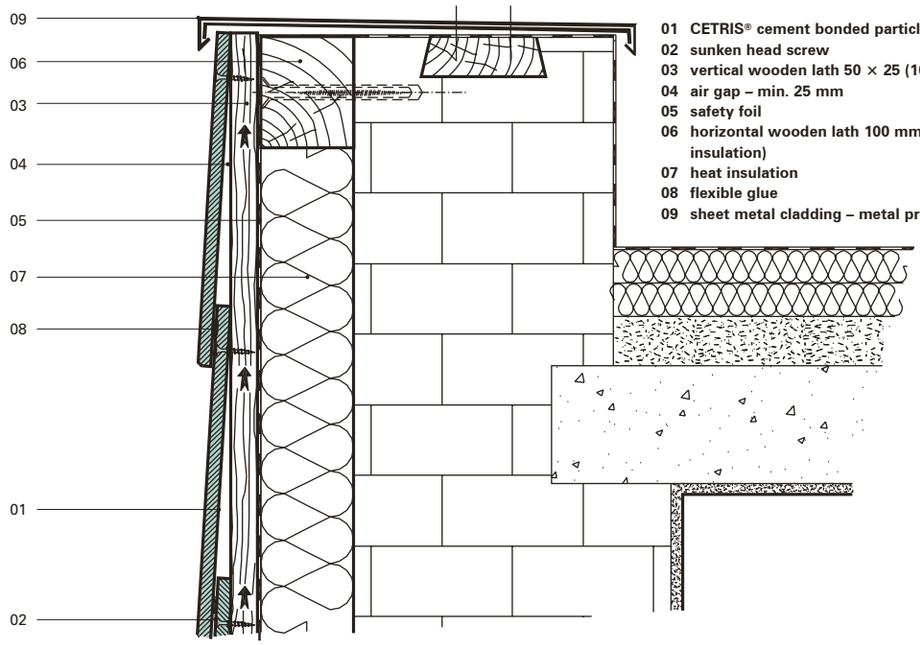
Vertical section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath 100 mm (thickness pursuant to insulation)
07 heat insulation
08 foundation slab
09 sheet metal cladding – metal product
10 flexible glue

Detail of upper ending. CETRIS® board on wooden grid, PLANK system

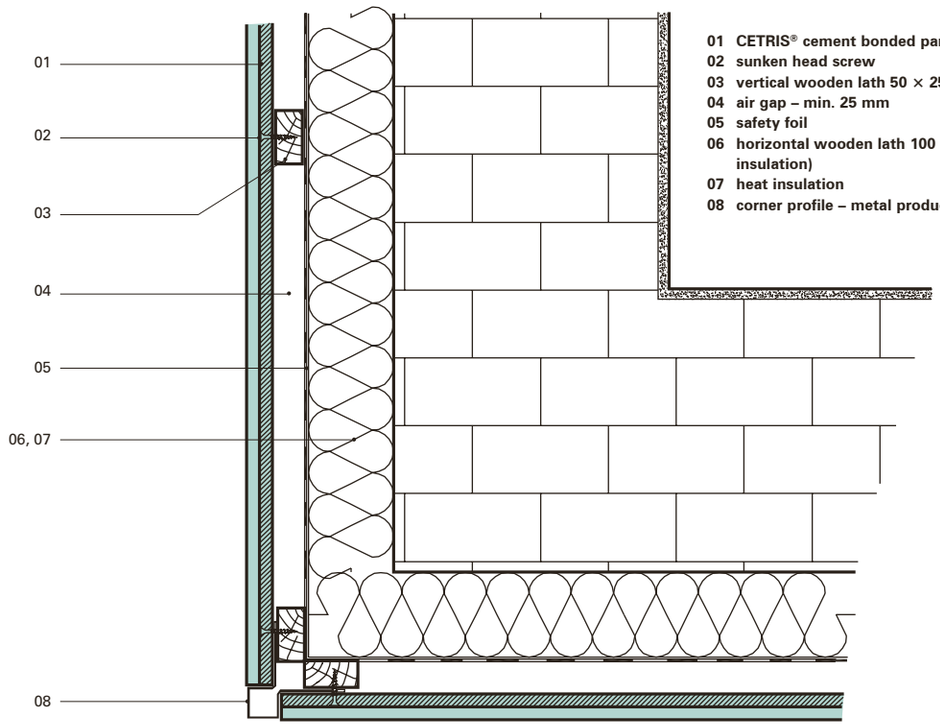
Vertical section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath 100 mm (thickness pursuant to insulation)
07 heat insulation
08 flexible glue
09 sheet metal cladding – metal product

Detail of exterior corner. CETRIS® board on wooden grid with corner profile, PLANK system

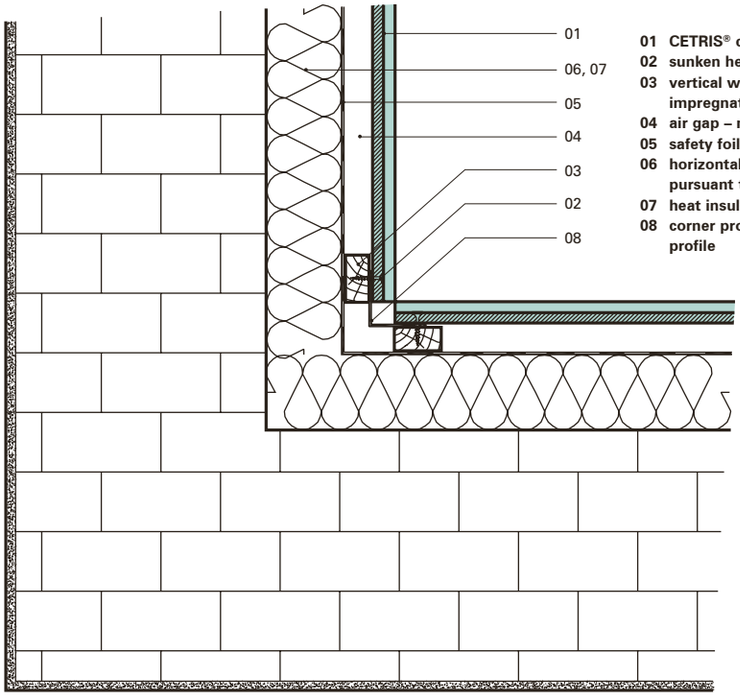
Horizontal section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath 100 mm (thickness pursuant to insulation)
07 heat insulation
08 corner profile – metal product or PROTECTOR profile

**Detail of interior corner.
CETRIS® board on wooden grid,
with corner profile, PLANK system**

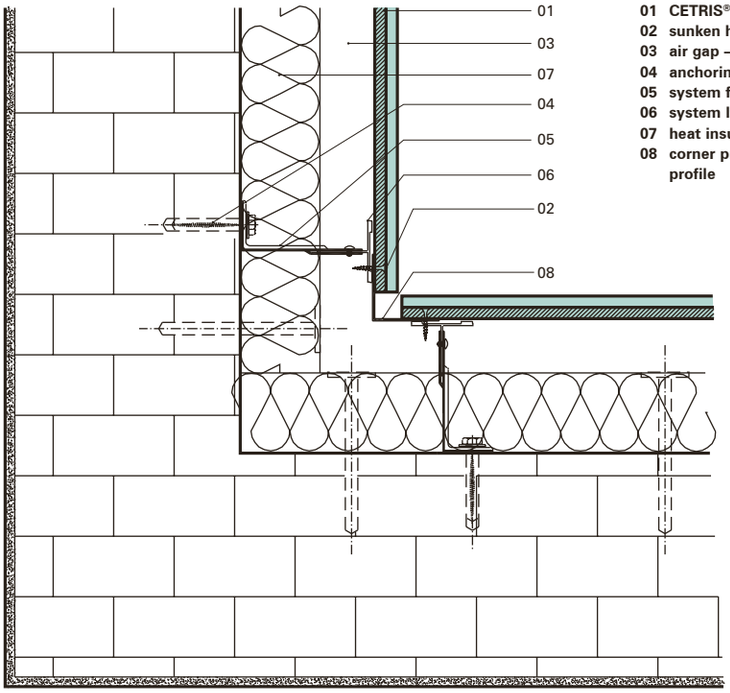
Horizontal section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath 100 mm (thickness pursuant to insulation)
07 heat insulation
08 corner profile – metal product or PROTECTOR profile

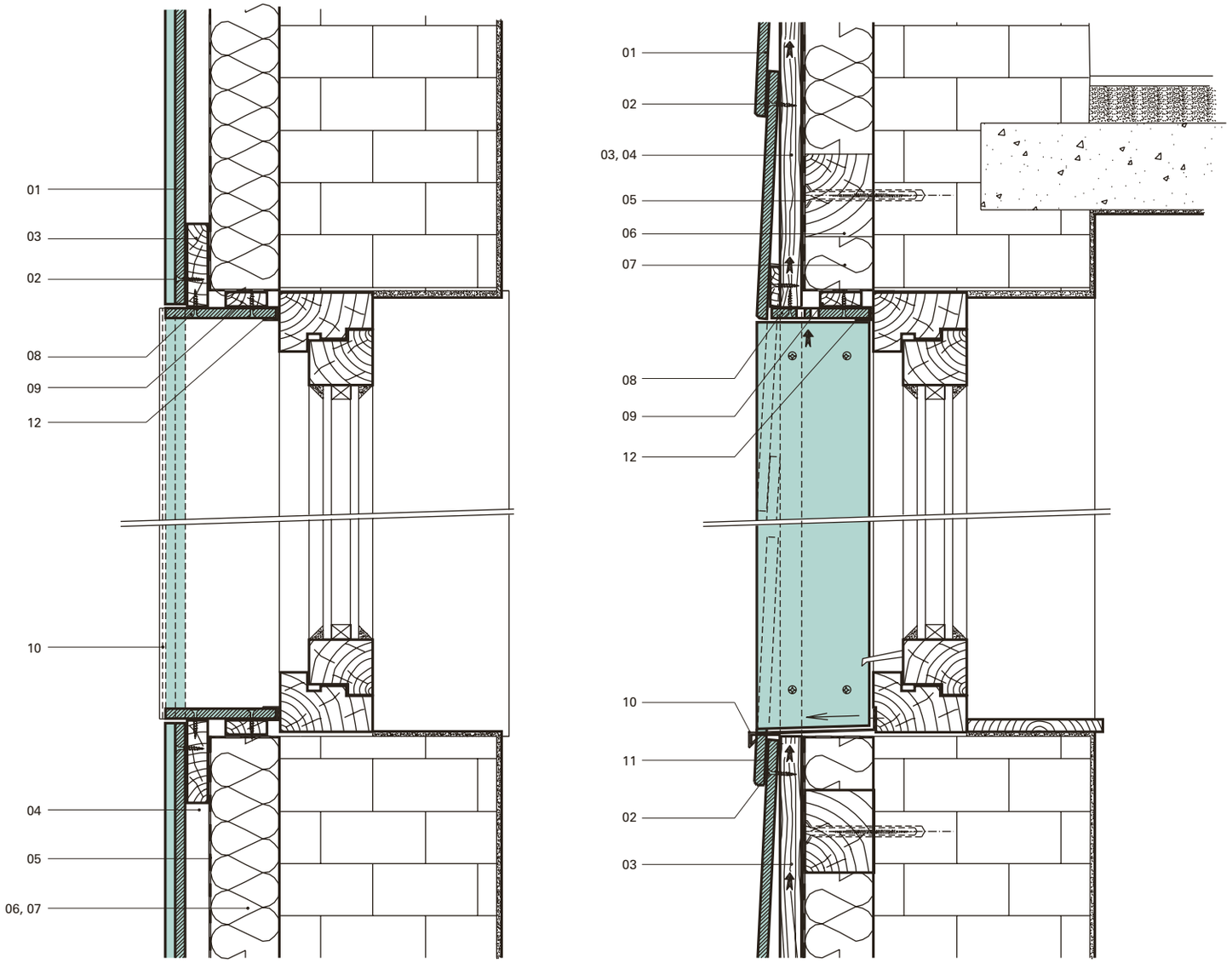
**Detail of interior corner.
CETRIS® board on system profiles
with corner profile, PLANK system**

Horizontal section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile
07 heat insulation
08 corner profile – metal product or PROTECTOR profile

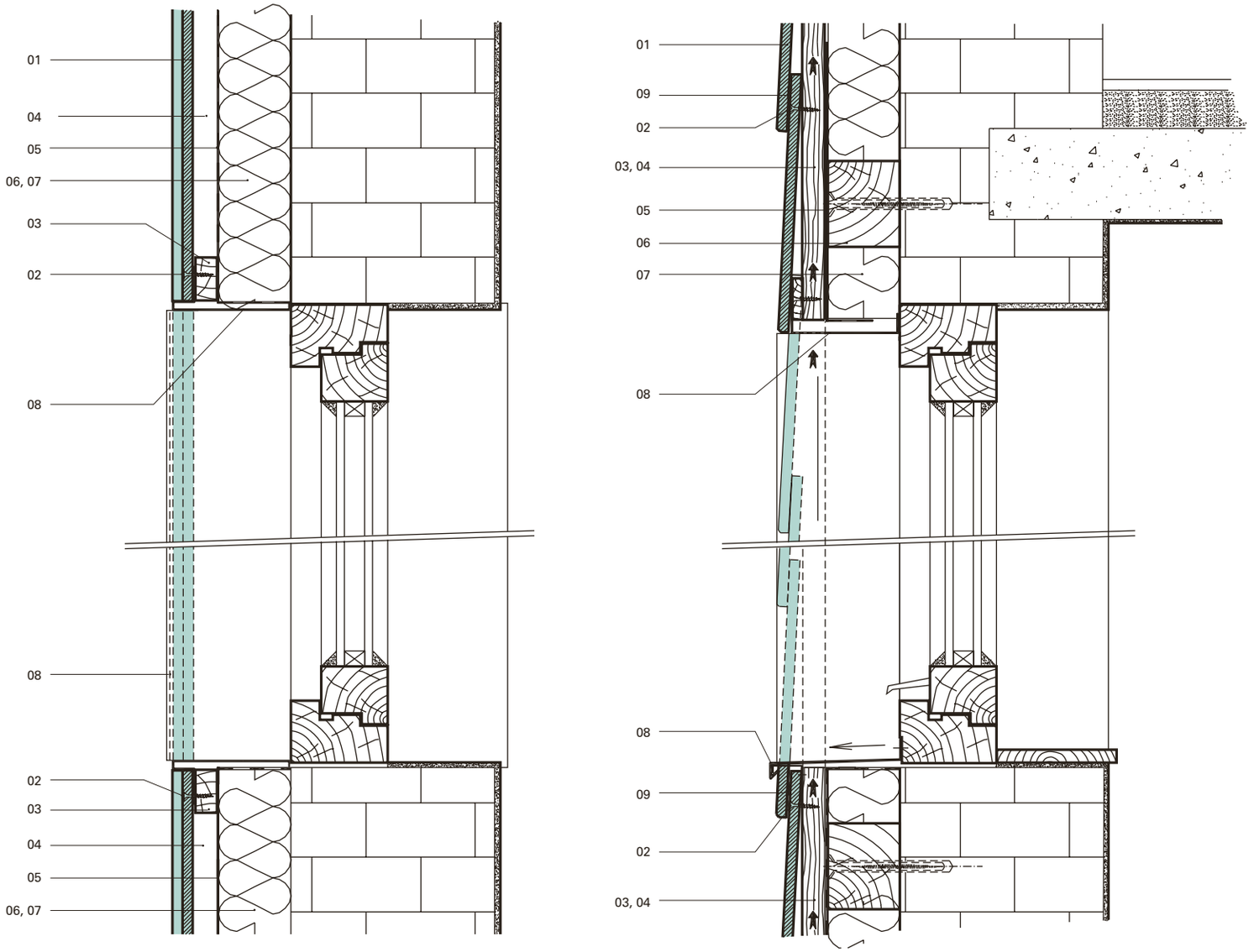
Detail of jamb and window head of opening, CETRIS® boards on wooden grid, PLANK system
Horizontal and vertical section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 heat insulation
08 jamb (window head) cladding – perforated CETRIS® board
09 wooden board thickness 18 mm
10 sheet metal cladding – metal product, or PROTECTOR profile
11 flexible glue
12 end profile (PROTECTOR)

Detail of jamb and window head of opening with sheet metal cladding, CETRIS® boards on wooden grid, PLANK system

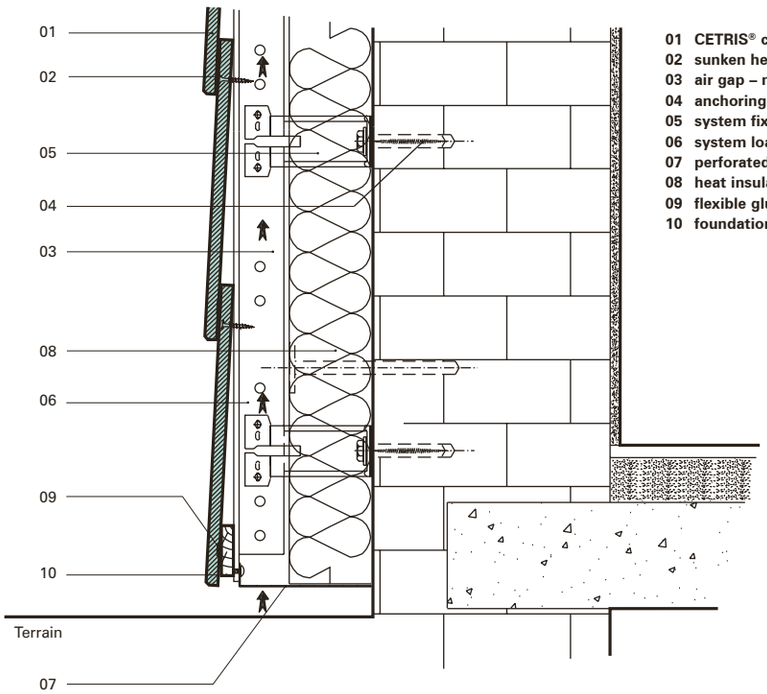
Horizontal and vertical section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 vertical wooden lath 50 × 25 (100 × 25) mm, impregnated
04 air gap – min. 25 mm
05 safety foil
06 horizontal wooden lath = 100 mm (thickness pursuant to insulation)
07 heat insulation
08 sheet metal cladding – metal product, or PROTECTOR profile
09 flexible glue

**Detail of bottom end with overlap.
CETRIS® board on system profiles,
PLANK system**

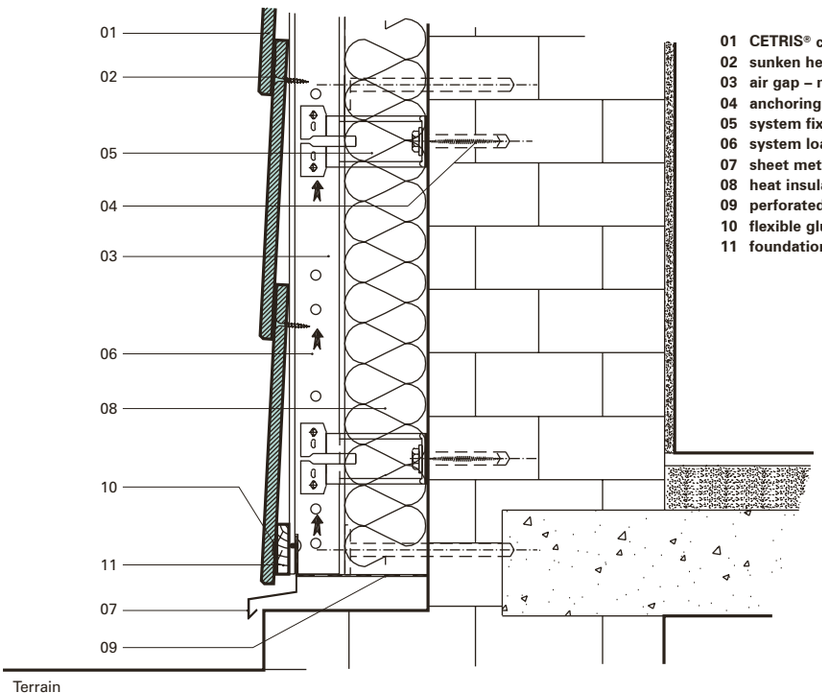
Vertical section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile
07 perforated venting profile (PROTECTOR)
08 heat insulation
09 flexible glue
10 foundation slab

**Detail of bottom end with sheet
metal cladding.
CETRIS® board on system profiles,
PLANK system**

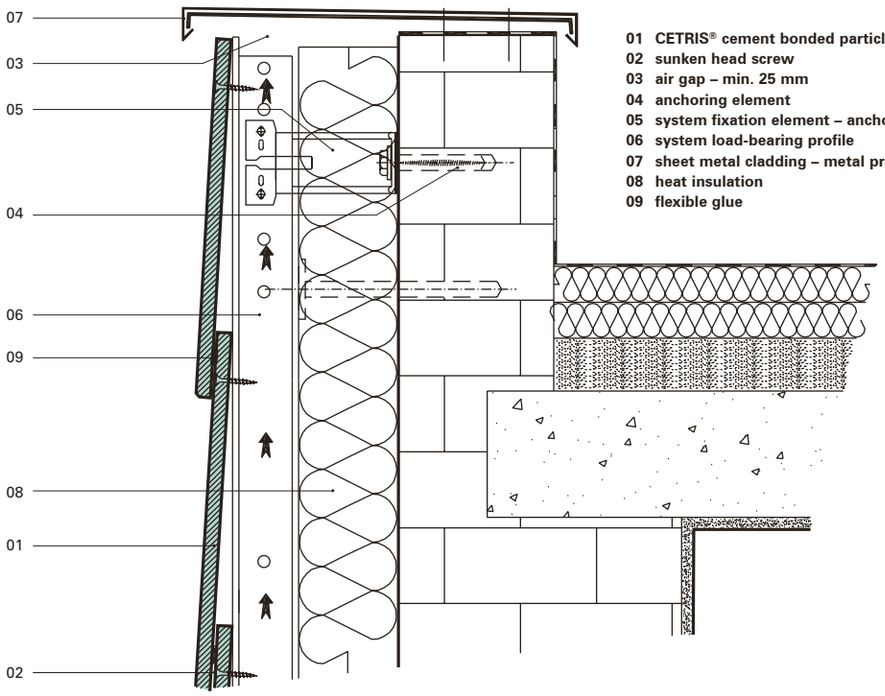
Vertical section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile
07 sheet metal cladding – metal product
08 heat insulation
09 perforated venting profile (PROTECTOR)
10 flexible glue
11 foundation slab

Detail of upper end.
CETRIS® board on system profiles, PLANK system

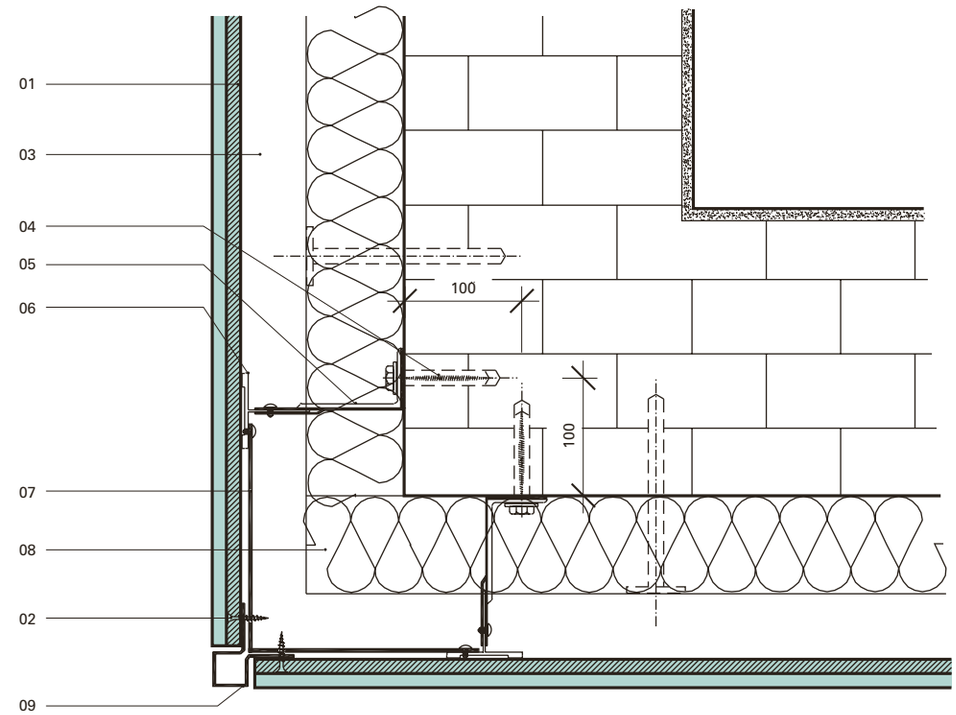
Vertical section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile
07 sheet metal cladding – metal product
08 heat insulation
09 flexible glue

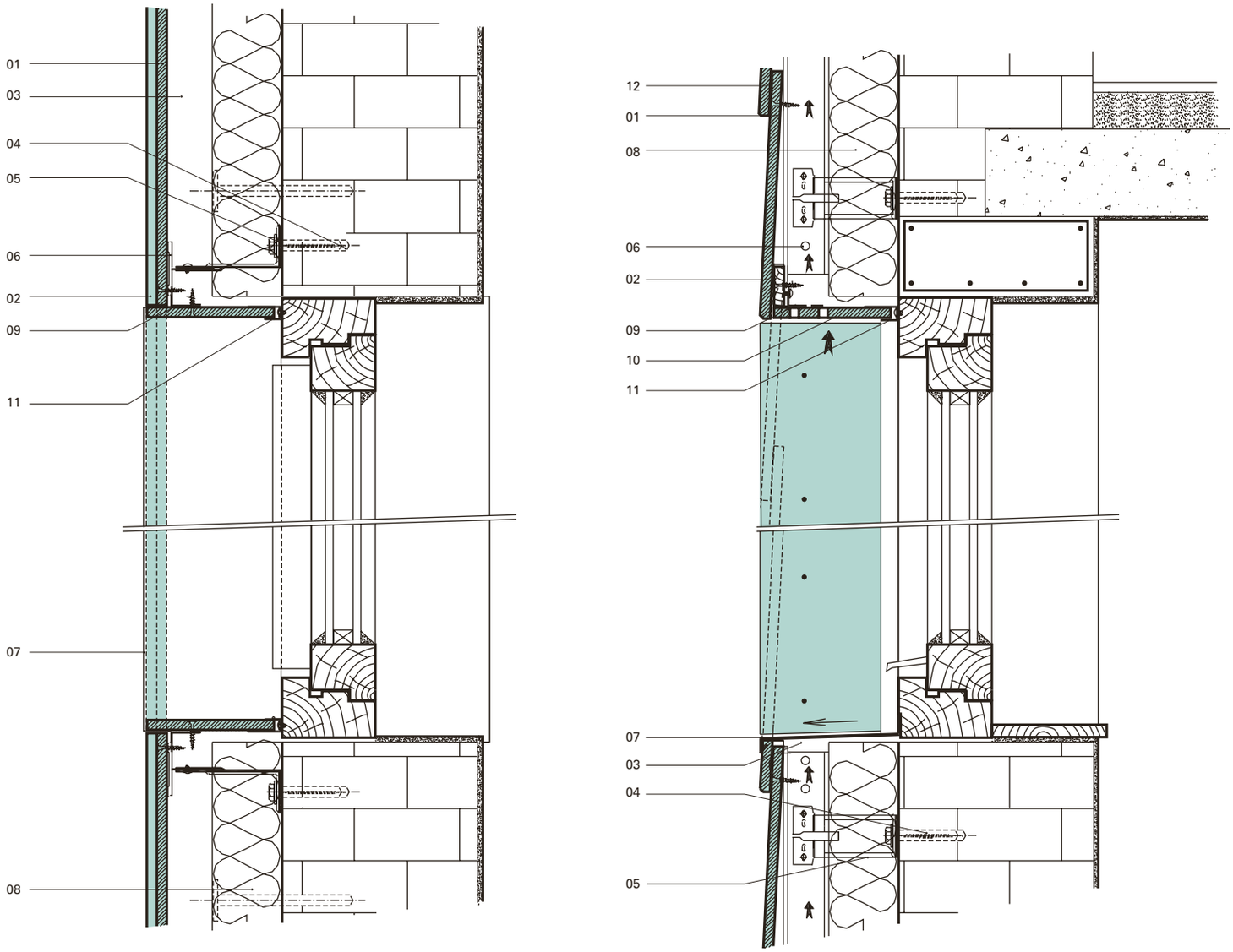
Detail of exterior corner.
CETRIS® board on system profiles, PLANK system

Horizontal section



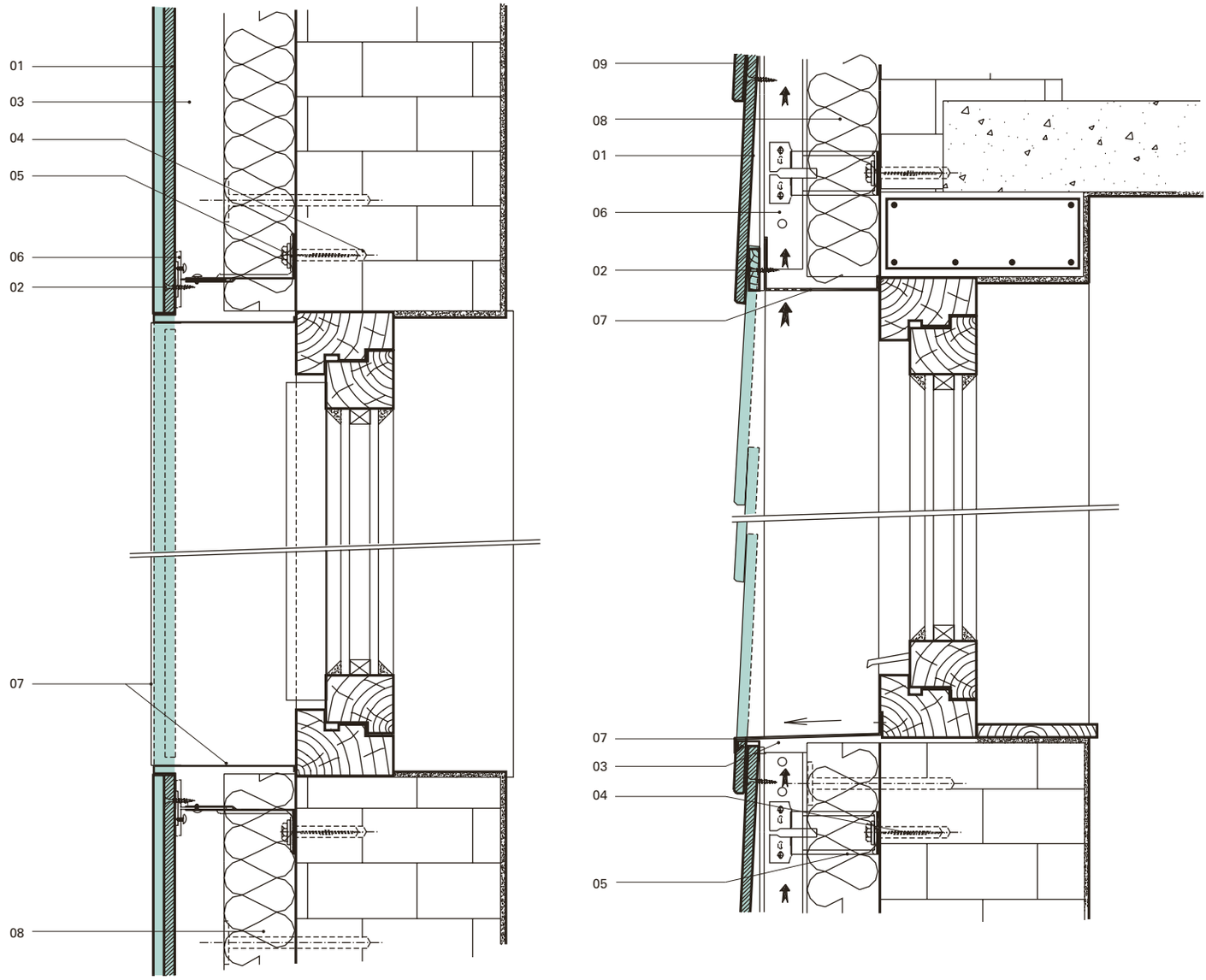
01 CETRIS® cement bonded particleboard
02 sunken head screw
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile
07 aluminium L profile
08 heat insulation
09 corner profile – metal product or PROTECTOR profile

Detail of jamb and window head of opening. CETRIS® boards on system profiles, PLANK system
Horizontal and vertical section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile
07 sheet metal cladding – metal product
08 heat insulation
09 aluminium L profile
10 jamb (door head) cladding – perforated CERTIS® board
11 flexible glue

Detail of jamb and window head of opening with sheet metal cladding. CETRIS® boards on system profiles, PLANK system
Horizontal and vertical section



01 CETRIS® cement bonded particleboard
02 sunken head screw
03 air gap – min. 25 mm
04 anchoring element
05 system fixation element – anchor
06 system load-bearing profile
07 sheet metal cladding – metal product
08 heat insulation
09 flexible glue

8.9 Railing, Terrace, Loggia and Balcony panels of CETRIS® Boards

For its high resistance to weather effects, fire and mechanical damage the CETRIS® cement bonded particleboard is used as a cladding element for exterior applications. In addition to building coating the CETRIS® board may be used as panels of railings, staircases, balconies, terraces, loggias etc.
To prevent injuries or material damage in the case of disintegration of these constructions, these thin walled and light constructions need to be impact tested.
This test has also been successfully passed by CETRIS® boards in various fixation variants. The tests were performed in the Plzen branch of the Civil Engineering Technical and Testing Institute on a test frame compliant with ČSN 73 0035, ČSN 73 2035. The load was selected pursuant to the requirement of ČSN 73 0035, art. 234 – impact with a non-flexible object with the weight of 1 kg flying horizontally with velocity of 17 m/s and impact with a panel object with the weight of 40 kg flying horizontally flexible velocity of 2.5 m/s. Following a repeated test (three times for the same load) the panel and its fixation in the frame were not damaged and the panel was fully usable.

8.9.1 Recommended and Tested Variants of Solutions of Railing panels of CETRIS® Board

8.9.1.1 Panel of CETRIS® board thickness 16 mm – mechanically anchored (with screws, rivets) to load-bearing frame

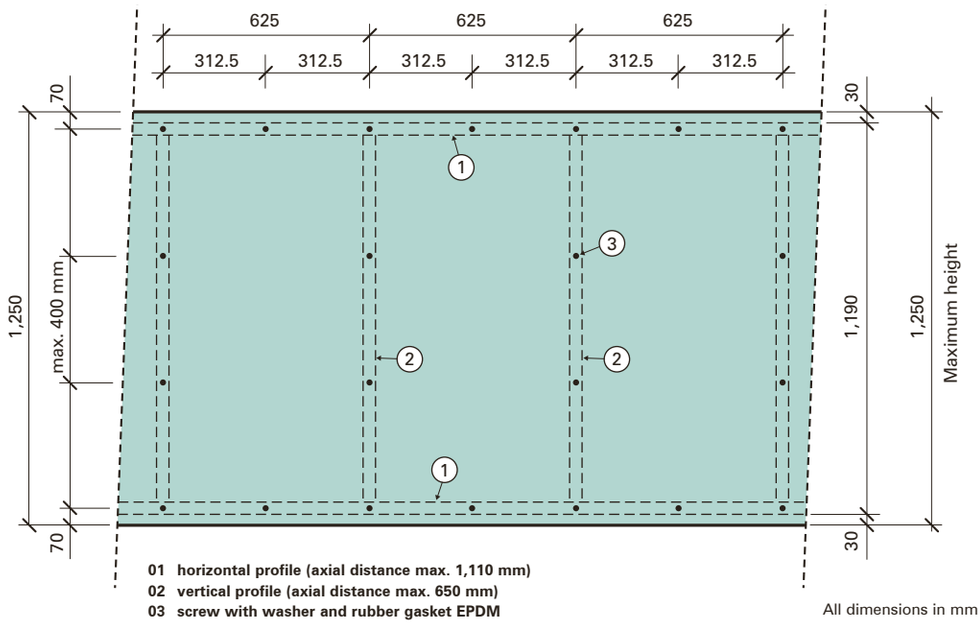
CETRIS® board fills of 16 mm thickness were tested. In this variant the panel – the CETRIS® board, thickness min. 16 mm – is fixed to the load-bearing construction with screws of rivets. The load-bearing frame is made of steel profiles 40 × 40 × 4 mm, maximum distance of vertical supports 625 mm.

This way of installation follows similar principles as façade applications:

- The boards are laid with the minimum joint width of 5 mm (when using CETRIS® boards lengths up to 3,350 mm the joint is extended to 10 mm)
- In the CETRIS® board there predrilled holed (hole diameter 8 mm for board sizes up to 1,600 mm, hole diameter 10 mm for board sizes above 1,600 mm)
- For anchoring, screws with washers and rubber gaskets are used – recommended type SFS SX 3/20 – 5.5 × 50 mm (clamping thickness 20 mm) or rivets – recommended types: ETANCO rivet Alu/stainless, open 4.8 × 24 mm (clamping thickness 20 mm), SFS AP 16-50210-S 5 × 21 mm (clamping thickness 18 mm)
- The minimum distance of the side screw/rivet from the vertical edge is at least 30 mm, and from the horizontal edge at least 70 mm, maximum distance of screws in the vertical support direction is 400 mm

Note: In the case of CETRIS® board longer than 1,875 mm the effect of thermal expansion of metal and shrinkage of CETRIS® board by humidity change must be considered – the offsets of edge screws/rivets from the vertical edge must be at least 50 mm.

Load-bearing construction and mechanical anchoring of railing fill – CETRIS® board 16 mm



01 horizontal profile (axial distance max. 1,110 mm)
02 vertical profile (axial distance max. 650 mm)
03 screw with washer and rubber gasket EPDM

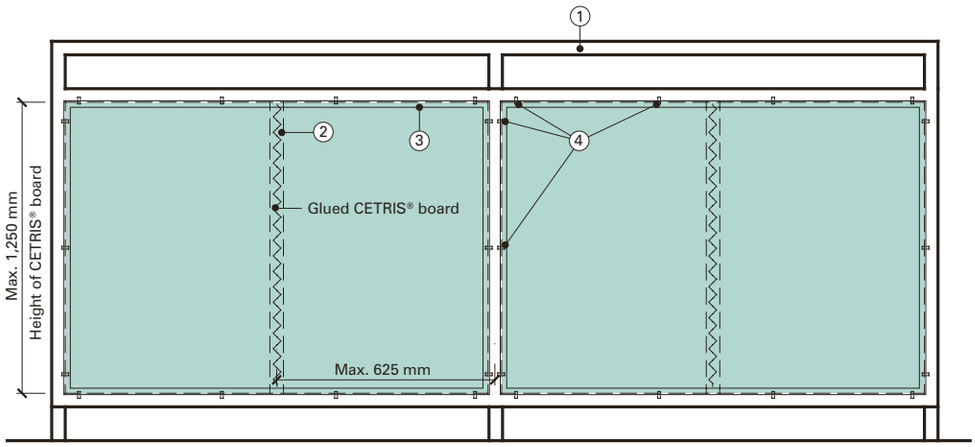
All dimensions in mm

8.9.1.1 Panel of CETRIS® board thickness 16 mm – fixed in peripheral lath and glued to inner brace

CETRIS® board, thickness min. 16 mm, used for railing panel, is inserted in a F-shaped lath with edge dilation 3 – 5 mm. The adjusted board is installed in the peripheral frame with vertical braces (max. axial distance 625 mm).

The F lath is riveted to the frame along the perimeter (maximum spacing 500 mm). The CETRIS® board is glued to the inner brace with DenBraven Mamut Glue High Tack. Therefore no anchoring element is visible from the visible side.

01 railing load-bearing frame
02 inside vertical braces of frame
03 peripheral F lath
04 rivets (connecting F lath and load-bearing frame)



8.10 Roof Overlap Underside Covering

CETRIS® cement bonded particleboards are also widely used for horizontal or oblique cladding of roof construction overlap. The selection of the board type, thickness, support spacing, anchoring method and surface finish are governed by the principles defined in chapters 3, 4 and 5. This text summarises these recommendations.

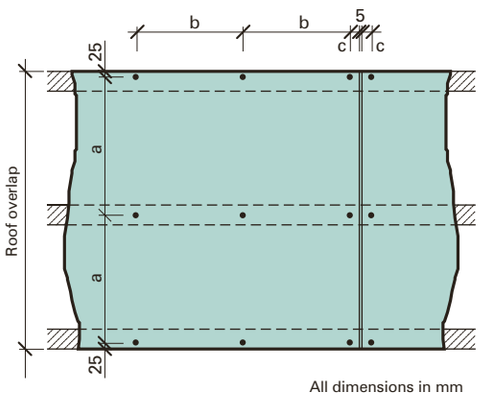
Board type selection
Cladding can be made with CETRIS® BASIC boards with subsequent surface finish or one of the CETRIS® boards with the surface finish already applied – FINISH and FINISH PROFIL.

Board thickness selection, support spacing
These two parameters are interrelated. The cladding follows the same principles as façade cladding, just due to the horizontal position the maximum distance between screws is reduced to 1/2 of the support spacing, see table.
Because of the weight of CETRIS® boards, thicknesses 8, 10, and 12 mm are used.

Support type
CETRIS® boards are mostly laid over a single-direction grid of wooden laths (width min. 50 mm, or if the lath falls over a joint of two boards, then min. 80 mm), or sheet metal zinc-coated profiles CD. If there is a fire resistance of the cladding required then the CETRIS® board must be mounted on CD profiles, including observance of the other principles defined in chapter 9.3.2.

Board thickness (mm)	Lath distance **a** (mm)	Screw distance **b** (mm)	Spacing **c** (mm)
8	400	200	> 25 < 50
10	500	250	
12	625	300	

If fire resistance is required from the ceiling panels then the CETRIS® board 12 mm must be used, including observance of the other principles defined in chapter 9.3.2.



All dimensions in mm

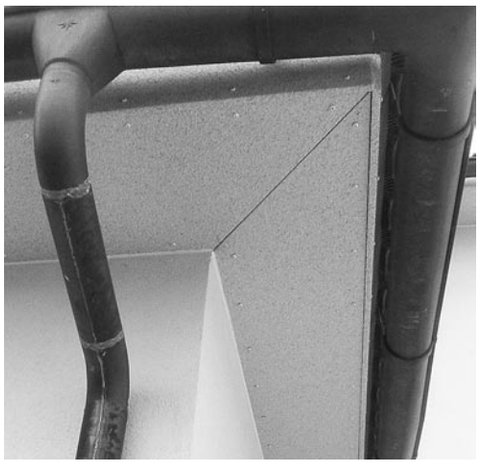
Board anchoring
CETRIS® boards are anchored with visible head screws (hexagonal or semi-lens – see chapter 8.7.6). The CETRIS® board is predrilled, the predrilled hole diameter is 8 mm (board length up to 1,600 mm) or 10 mm. Only in the case of a joint-less surface finish of the boards (plaster), sunken head screws are used.

Surface finish, joint design
CETRIS® boards with a surface finish (FINISH, FINISH PROFIL) do not need any further treatment on site, just anchoring to the load-bearing construction.
CETRIS® BASIC or CETRIS® PLUS boards may be treated in several ways:

- **Painting**. The joints between the boards are left empty or filled with flexible filler (i.e. Den Braven ST-5, Soudaflex LM 14, Botact A4, etc.) and provided with primer (penetration) and a final façade top coat (acrylic or silicone paint).

- **Plastering**. In this case please follow the principles defined in chapter 6.4 Exterior Plasters, i.e.:
  – CETRIS® BASIC boards treated with a penetrating primer
  – Insulation (polystyrene, mineral wool) glued and mechanically anchored with dowel discs

– Cement filler applied and arming textile inserted and plastered
– The base penetrated and plastered



8.11 Cladding of Bottom Structure (Basement)

CETRIS® cement bonded particleboards, used as the cladding of a suspended vented façade, are also suitable for base moulding lining. All principles for use (type of CETRIS® board, board thickness selection, support spacing, anchoring method, surface finish etc.) are defined in the previous text, chapters 3, 4 and 5. The following text summarises these recommendations:

Board thickness (mm)	Support distance **a** (mm)	Screw distance **b** (mm)	Spacing **c (mm)**
10	500	250	> 25 < 50
12	625	300	
14	625	300	
15	625	300	

Board type selection
Basement cladding can be made with CETRIS® BASIC boards with subsequent surface finish or one of the CETRIS® boards with the surface finish already applied – FINISH and FINISH PROFIL.

Board thickness selection, support spacing
These two parameters are interrelated. The cladding follows by the same principles as façade cladding. The minimum recommended board thickness is 10 mm, in the case of possibly increased mechanical load (exposed surfaces – traffic) CERTIS® 14 or 16 mm is recommended.

Support type
CETRIS® boards are mostly laid over a single-direction grid of wooden laths (width min. 50 mm, or if the lath falls over a joint of two boards, then min. 80 mm). A recommended solution for anchoring of impregnated wooden elements with simultaneous levelling of the surface is the use of STEN distance screws. Also zinc-coated L profiles may be used (or J profiles) installed on anchors (brackets) – such as DEKMETAL DKM1A.

Board anchoring
CETRIS® boards are anchored with visible head screws (hexagonal or semi-lens – see chapter 8.7.6). The CETRIS® board is predrilled, the predrilled hole diameter is 8 mm (board length up to 1,600 mm) or 10 mm.
Only in the case of a joint-less surface finish of the boards (plaster) sunken head screws are used.

Surface finish, joint design
CETRIS® boards with a surface finish (FINISH, FINISH PROFIL) do not need any further treatment on site, just anchoring to the load-bearing construction.
CETRIS® BASIC or CETRIS® PLUS boards may be treated in several ways:

- **Painting**. The joints between the boards are left empty or filled with flexible filler (i.e. Den Braven ST-5, Soudaflex LM 14, Botact A4, etc.) and provided with primer (penetration) and a final façade top coat (acrylic or silicone paint).
- **Plastering**. In this case please follow the principles defined in chapter 6.4 Exterior Plasters, i.e.:
  – CETRIS® BASIC boards treated with a penetrating primer
  – Insulation (polystyrene, mineral wool) glued and mechanically anchored with dowel discs
  – Cement filler applied and arming textile needs to be inserted and plastered
  – The base penetrated and plastered