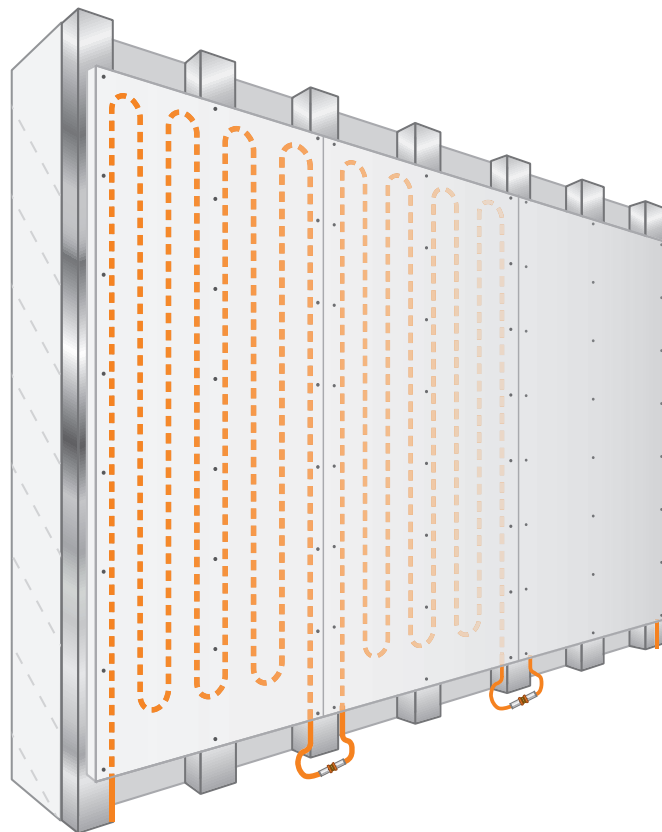




Installation

VARIOTHERM
HEATING. COOLING. COMFORT.



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1. Safety information

1.1 General informations

- These installation instructions are intended for authorised specialist personnel.
- Observe locally applicable provisions and standards for electrical installations and cooling/heating systems as well as for drywall construction.

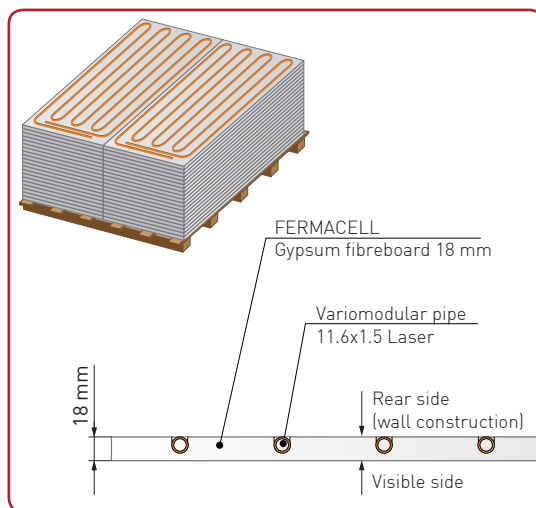
1.2 Guarantee conditions

If the heating/cooling system is installed or commissioned incorrectly, all claims on the basis of the manufacturer's warranty and guarantee become void. Our respective applicable installation instructions are an integral part of our guarantee!

1.3 ModulePanel

The ModulePanel consists of:

- The FERMACELL gypsum fibreboard 18 mm
- The pre-integrated Variomodular pipe 11.6x1.5 Laser (aluminium multi-layer composite pipe)



The ModulePanels are supplied on pallets.

When storing the ModulePanel pallets, you should ensure that the storage area can support them.

Each ModulePanel weighs 20.5 kg/m².

The ModulePanels must be laid flat on a level surface.

They should be protected from moisture. Panels that have become damp for a short time should only be used after they have completely dried out.

If they are re-stacked during transport on the building site, the visible side of the ModulePanels should be laid so that they face downwards.

Vertical storage deforms the panels and damages the edges. It is possible to transport the panels horizontally inside the building with a lift truck or other panel transportation vehicle.



It is best to carry individual ModulePanels vertically.

1.4 Maximum flow temperature

The maximum flow temperature for the ModulePanels is 50 °C.

1.5 Moisture classes

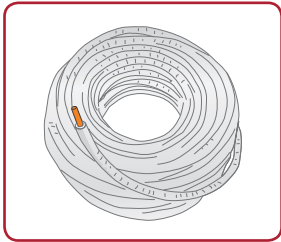
The modular panels can be used in rooms up to moisture class W3 (ÖNORM B 2207). They are not approved for installation in moisture class W4 (e.g. canteens and shower blocks).

1.5 Variomodular pipe 11.6x1.5 Laser



The Variomodular pipe 11.6x1.5 Laser is a multi-layer composite aluminium pipe (100% oxygen diffusion-tight). It is pre-integrated in the ModulePanels. In order to prevent the Variomodular pipes from being damaged by drilling or chiselling during the construction phase, high-visibility warning signs should be placed at appropriate locations. In terms of weather resistance, the same instructions apply to the Variomodular pipe 11.6x1.5 Laser as to the pre-insulated Variomodular pipe 16x2.

1.6 Pre-insulated Variomodular pipe 16 x 2



The pre-insulated Variomodular pipe 16 x 2 is only weather-resistant to a limited extent, and must be shielded from direct sunlight. The Variomodular pipe should not be stored outdoors.

The interaction of the air's oxygen with UV rays damages the pipes. Normal temporary storage on the construction site for a few days is permissible.

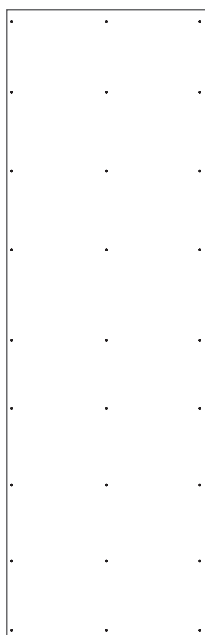
1.7 Fire protection

From a fire protection perspective, the 18 mm Variotherm ModulePanels correspond to a 12.5 mm FERMACELL Gypsum fibreboard panel (Test IBS-Linz No. VFA2001-0389.01, fire protection assessment file number 10111710). Please observe the corresponding FERMACELL regulations and FERMACELL fire protection assessments.

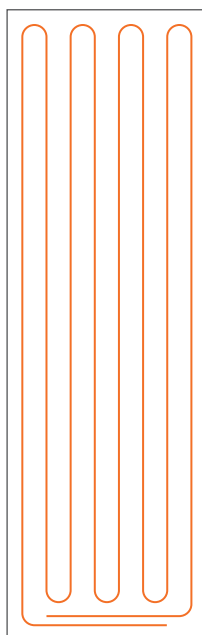
1.8 Load bearing walls

Caution: With load bearing wall construction the Variotherm ModulePanels must not carry any static ceiling loads and must not be used for building reinforcement.

1.9 Visible side/rear side of the ModulePanel



Visible side



Rear side

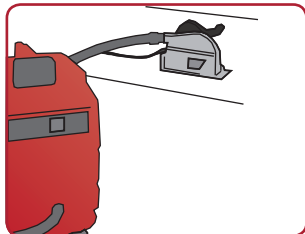
The ModulePanels are installed so that the integrated Variomodular pipes are not visible after installation.

The visible side faces into the room and the rear side faces the substructure.

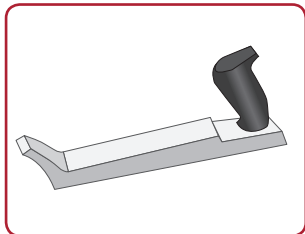
2. Tools, work documents

2.1 Tools for installing the ModulePanels to the substructure (on-site)

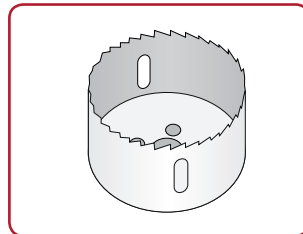
Cutting tools



Circular saw with vacuum attachment



Plane for visible edges

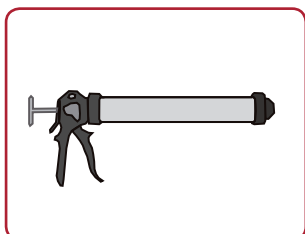


Hole saw

Fastening tools



Power screw gun, preferable with latching depth stop



Cartridge gun for joint adhesive

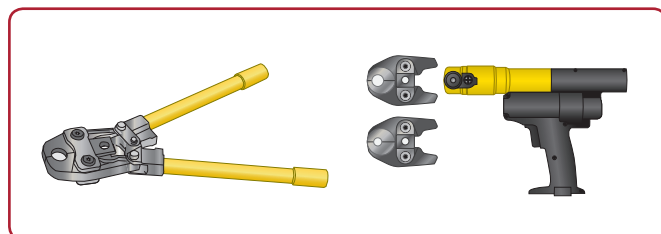
2.2 Tools for connecting the Variotherm pipes (available from Variotherm)



Pipe cutting pliers



Calibration and chamfering tool

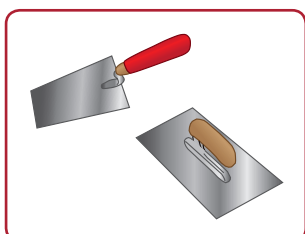


EcoPress or AkkuPress Mini pressing tool, incl. press-fitting jaws

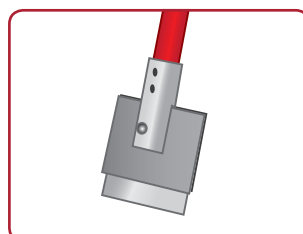
2.3 Tools for stopping the ModulePanel seams (on-site)



Clean buckets



Trowel and plastering knife



Adhesive scraper

2.4 Other work documents

Please also observe the latest FERMACELL planning and installation instructions!



3. Substructure

This chapter shows possible substructures for the ModulePanels and special issues to be noted before and during installation of the ModulePanels. Independently of this, please observe the planning and installation guidelines of the manufacturer of the wooden or drywall system used for your wall and pitched roof ceiling construction.

Depending on the requirements, substructures are made of wood and/or metal, with or without surface planking, cavity insulation and vapour retarders (vapour barriers).

With wooden constructions, the timber used must be sufficiently dry and straight, and conform to the Austrian standard DIN 4074-1 (quality class 2 and cutting class S = sharp-edged).

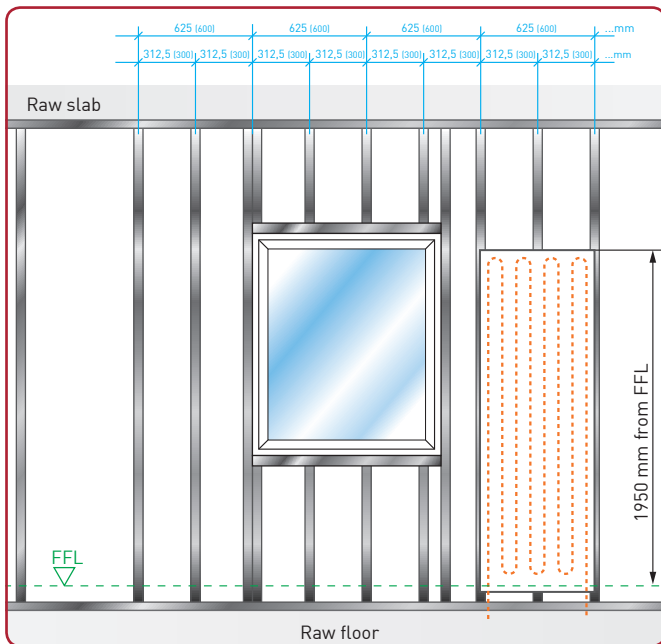
With metal constructions, the profiles must be made of soft, non-alloyed steel with double-sided galvanising of at least 100 g/m² according to the Austrian standard DIN 18182-1.

Before installing the ModulePanels it must be ensured that the construction is designed to carry the weight of the ModulePanels (20.5 kg/m²) and any eventual cladding (tiles).

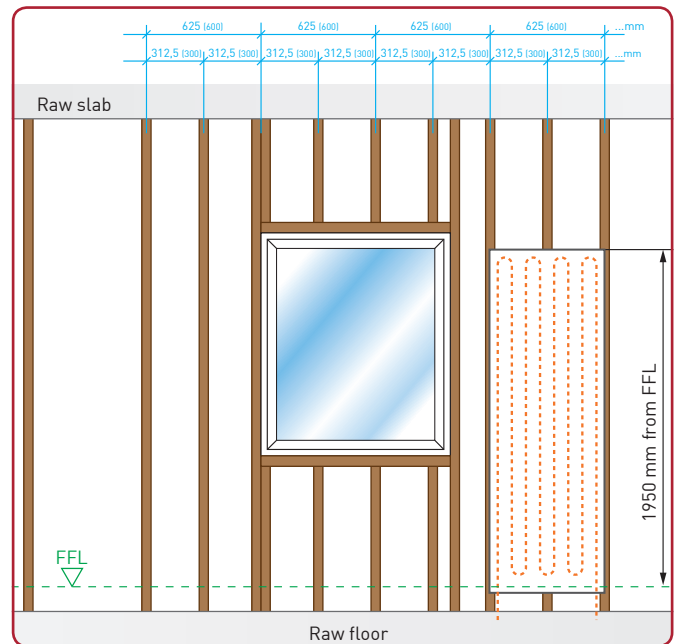
Caution! Do not glue the ModulePanels directly to solid wall structures (plaster).

3.1 Vertical stud construction

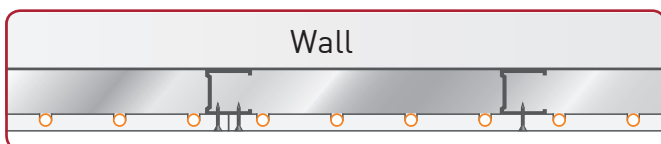
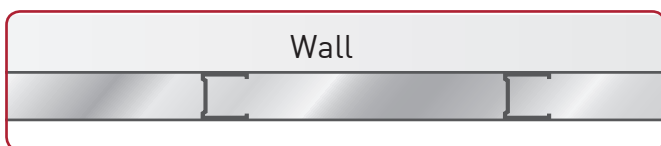
Substructure with wooden or metal profiles at a stud clearance of 312.5 mm, with or without insulation as required. With larger existing stud clearances, extra vertical studs are used at the intended heating/cooling surfaces.



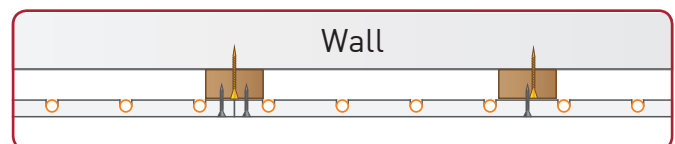
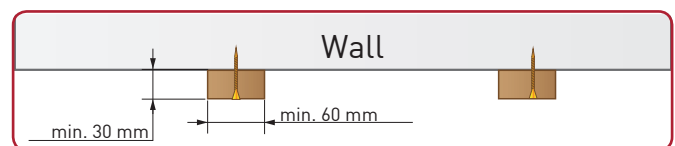
Example of CW stud profile construction



Example of wooden stud construction



Section through a CW/UP profile steel substructure with a 312.5 mm stud clearance, without cavity insulation.



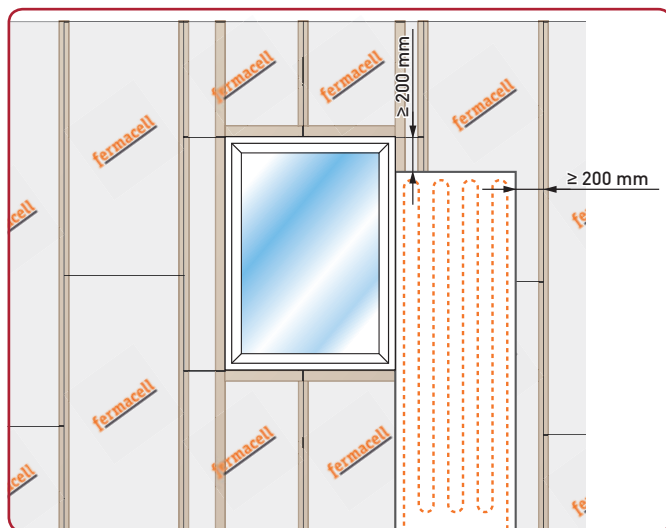
Section through a softwood wooden construction with a 312.5 mm stud clearance, without cavity insulation.

3.2 Stud construction with full-surface FERMACELL planking

The substructure is fully planked with FERMACELL panels. The stud clearance of the substructure corresponds to the values in the table.

Caution! Does not apply to the Variotherm ModulePanels!

Application area/ Construction type	Max. stud clearances of the substructure in mm for the following thicknesses of FERMACELL panels ¹⁾			
	10 mm	12.5 mm	15 mm	18 mm
Vertical surfaces (partition walls, wall cladding, single wall panels)	500	625	750	900
Pitched roof ceiling cladding (10 - 50° pitch)	335	420	500	550
¹⁾ Limiting conditions: <ul style="list-style-type: none"> • In the case of fire protection requirements, the specifications of the respective test verification/certification should be observed. • Not possible in rooms where use results in constant high humidity (wet rooms etc.). 				



The ModulePanels are fastened to the FERMACELL panels (Panel thickness of 1st layer at least 12.5 mm) using the following fasteners:

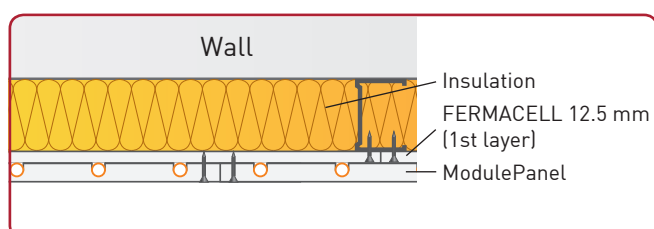
- Fermacell dry wall screws FTC40
Quantity of screws see table in chapter 4.1
- Straddle staples
+ galvanised and resinated
+ wire diameter ≥ 1.5 mm
+ saddle width: ≥ 10 mm
+ leg length 2-3 mm shorter than the thickness of both panel layers

Clearance between staples: max. 150 mm

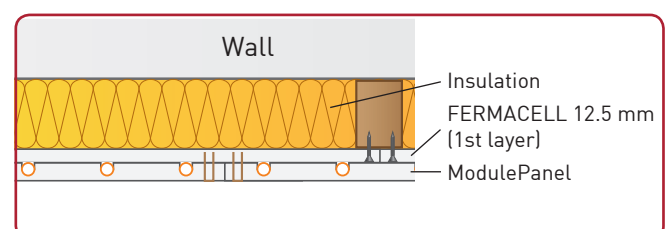
Clearance between staple rows: as fastening area (see chapter 4.2)

Caution!

- Ensure a minimum seam offset of 200 mm to the FERMACELL planking.
- Avoid cross joints.
- With multi-layer Fermacell planking only the ModulePanels (last layer) are glued and stopped.



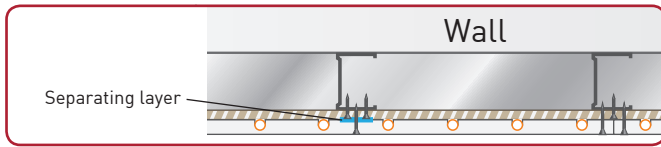
Section through a CW/UW profile **steel construction**, single-sided with **12.5 mm thick FERMACELL** panels, single-layer planking with cavity insulation and installed ModulePanel (**screwed**).



Section through a softwood **wooden construction**, single-sided with **12.5 mm thick FERMACELL** panels, single-layer planking with cavity insulation and installed ModulePanel (**clip fasteners**).

3.3 Stud construction with plasterboard planking

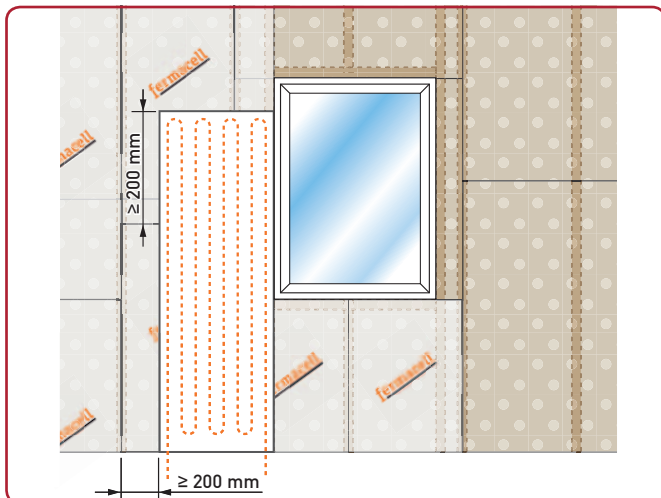
Fastening of ModulePanels to stud construction



constructed as described in chapter 3.1 (stud clearance 312.5 mm).

With plasterboard panels the lack of screw retention strength means that the ModulePanels can only be directly fastened to the underlying stud construction with offset seams. In this case the substructure is

Fastening of ModulePanels with additional full-surface FERMACELL planking



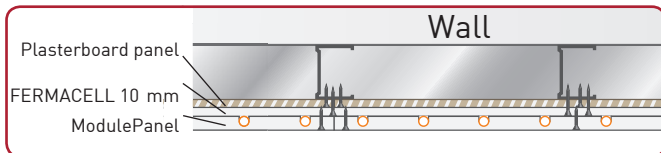
If the substructure can no longer be changed, appropriately thick FERMACELL panels (see table in chapter 3.2) are screwed to the stud construction behind the plasterboard planking.

The seams of the FERMACELL planking are not glued or stopped.

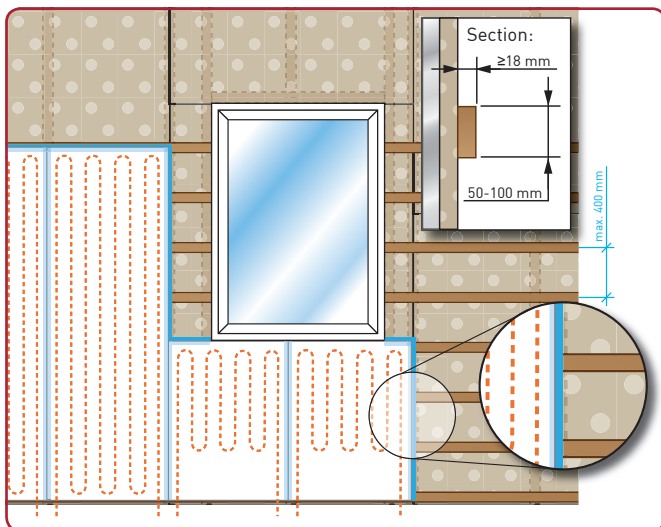
The ModulePanels are directly glued or stapled to the FERMACELL planking (see chapter 3.2) with offset seams.

Caution!

- Ensure a minimum seam offset of 200 mm to the FERMACELL planking.
- Avoid cross joints.



Fastening of ModulePanels with additional recessed formwork

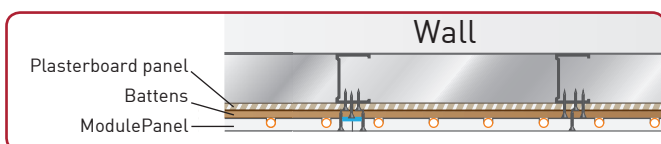


If the substructure can no longer be modified or full-surface FERMACELL planking cannot be fastened, additional horizontal battens (recessed formwork) are screwed to the underlying stud construction, as described in chapter 3.5.

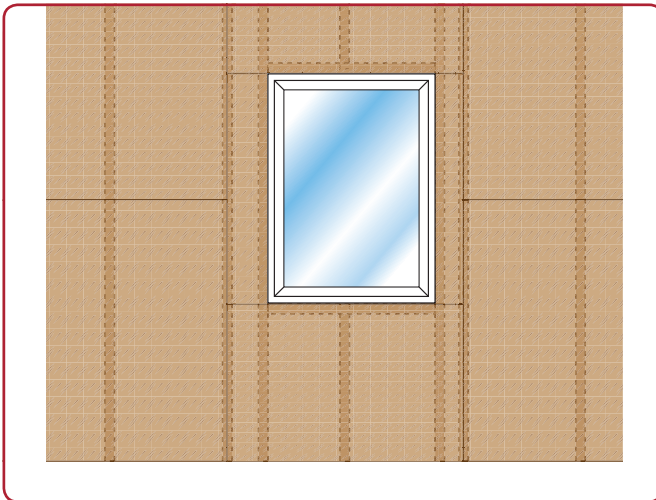
Batten guidelines (recessed formwork):

- Height: 50 - 100 mm
- Thickness: min. 18 mm
- Stud clearance: max. 400 mm

A separating layer (adhesive tape) is applied to the adhesive seam (along the abutting seam).



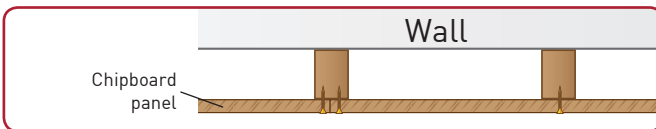
3.4 Full cladding or chipboard panel planking



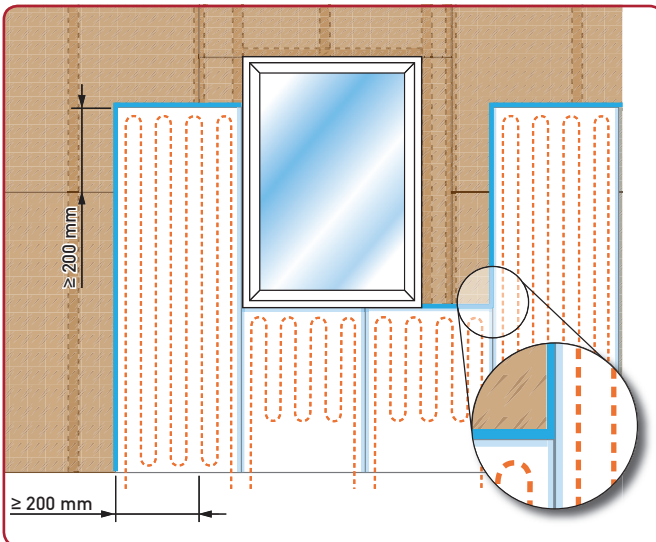
Chipboard panels and ModulePanels (FERMACELL gypsum fibreboards) have different expansion and contraction behaviour under climatic fluctuations. The fastening variants described below can be recommended when the chipboard panels are not subjected to moisture loads.

Caution!

- Ensure a minimum seam offset of 200 mm to the planking.
- Avoid cross joints.



Example: Cross-section through full-cladding with chipboard panels



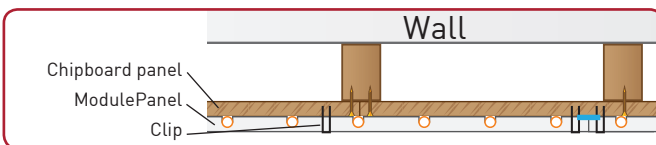
The ModulePanels are fastened using the following straddle staples:

- + galvanised and resinated
- + wire diameter ≥ 1.5 mm
- + saddle width: ≥ 10 mm
- + leg length 2-3 mm shorter than the thickness of both panel layers

Clearance between staples: max. 150 mm

Clearance between staple rows: as fastening area (see chapter 4.2)

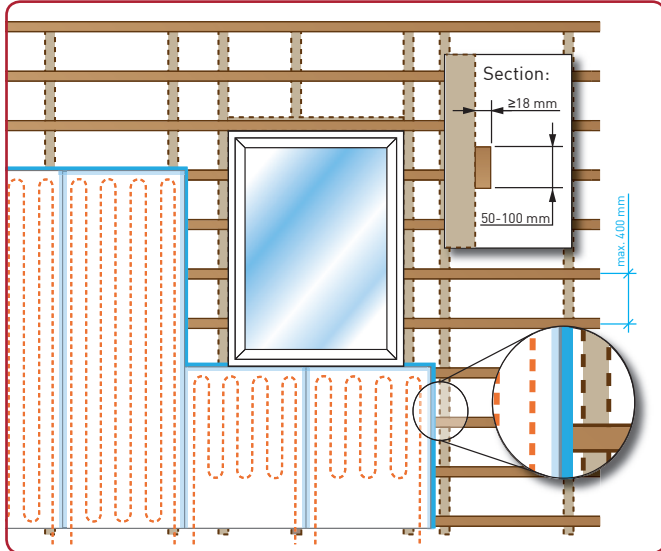
A separating layer (adhesive tape) is always inserted in the glued seam area.



Special case: With chipboard panels having expansion and contraction values of max. 0.02 % (for changes to the material moisture of 1 % below the fibre saturation) the ModulePanels can also be screwed to the planking. According to DIN EN 1995 Table NA.7 this includes plywood, cross-laminated timber and OSB/4 panels. In this case it is important that the panels have adjusted to the relative humidity of the working climate. The humidity during installation, construction and use of the building must be 30-65 %.

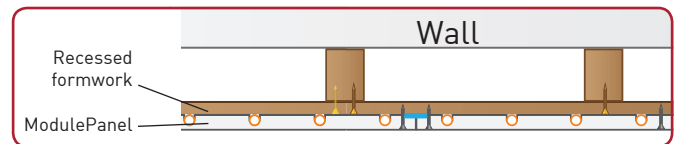
3.5 Recessed formwork

Extra recessed formwork is installed if the substructure does not have the correct batten clearance (312.5 mm). Horizontal wooden battens and ModulePanels have different expansion and contraction behaviour. A separating layer — (adhesive tape) is always inserted in the glued seam area. This prevents a non-positive connection between the chipboard panel and the ModulePanel (otherwise a danger of cracking).



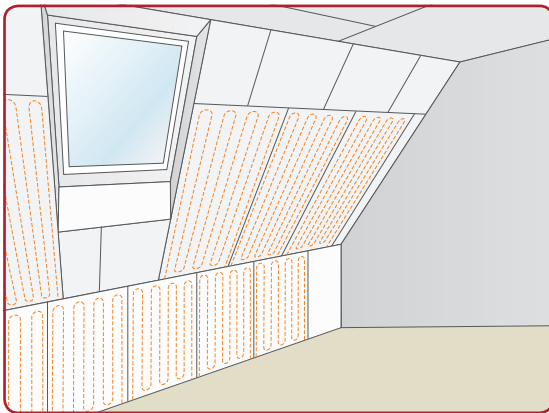
Batten guidelines (recessed formwork):

- Height: 50 - 100 mm
- Thickness: min. 18 mm
- Stud clearance: max. 400 mm



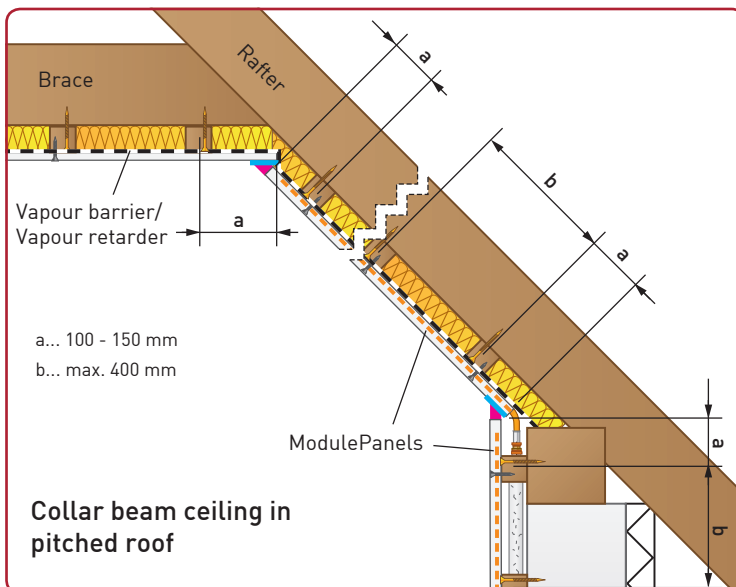
Cross-section through wooden recessed formwork, incl. ModulePanel with rear timber stud construction.

3.6 Pitched roof substructure

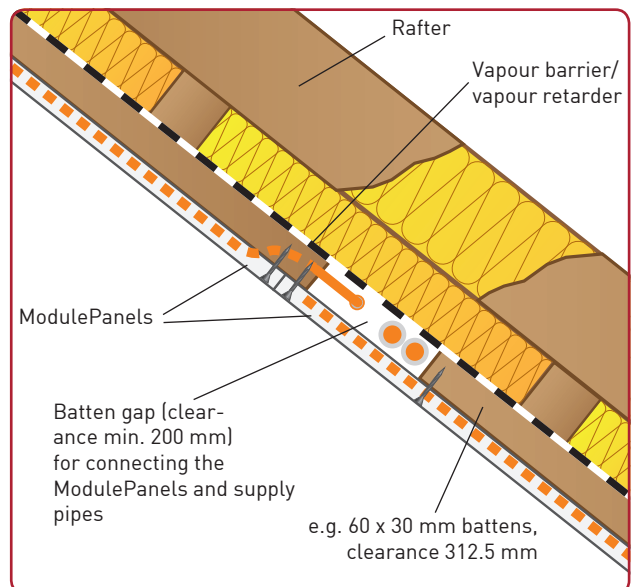


For a pitched roof, the same substructure possibilities apply as for walls (chapters 3.1 - 3.5).

When two ModulePanels are abutted above each other in a pitched roof then additional vertical battens for the supply pipes are absolutely necessary!



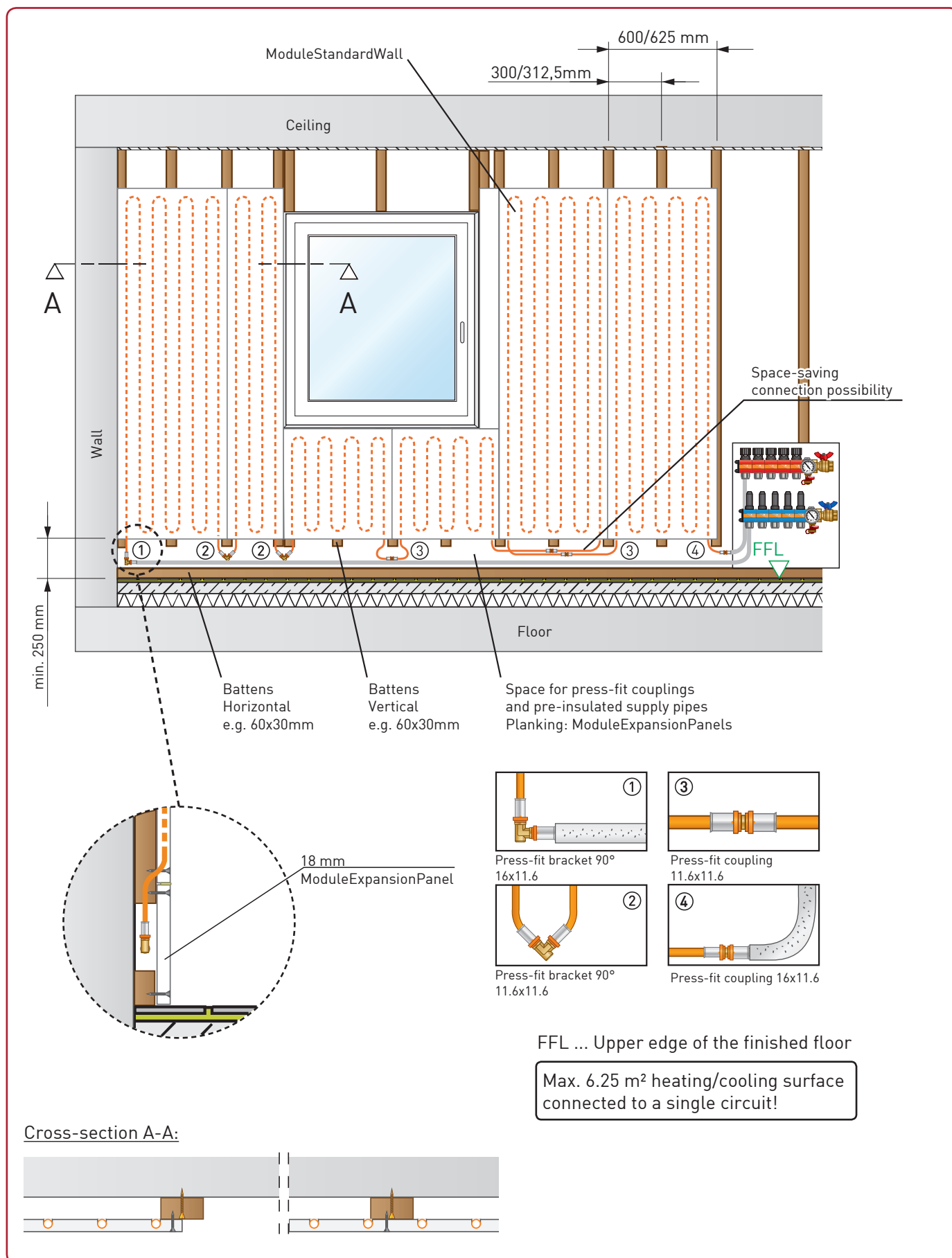
Horizontal battens



Vertical battens - 2 ModulePanels

3.7 Substructure variant for existing floors

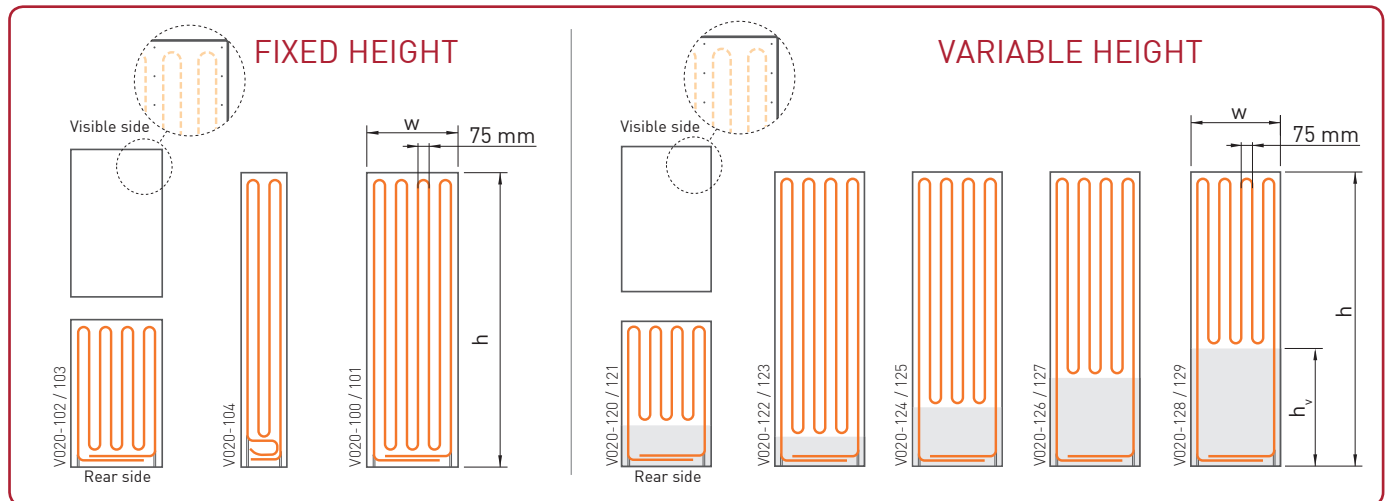
When retrofitting the modular wall heating/cooling the supply pipes are laid in the batten layer.



4. Installing the ModulePanels

4.1 ModuleStandardPanels-Classic - Types

Fixed and variable ModuleStandardPanels have been developed to accommodate the different local conditions on building sites.



Fixed height:

The entire surface of the ModulePanel serves as a heating/cooling area.

Variable height:

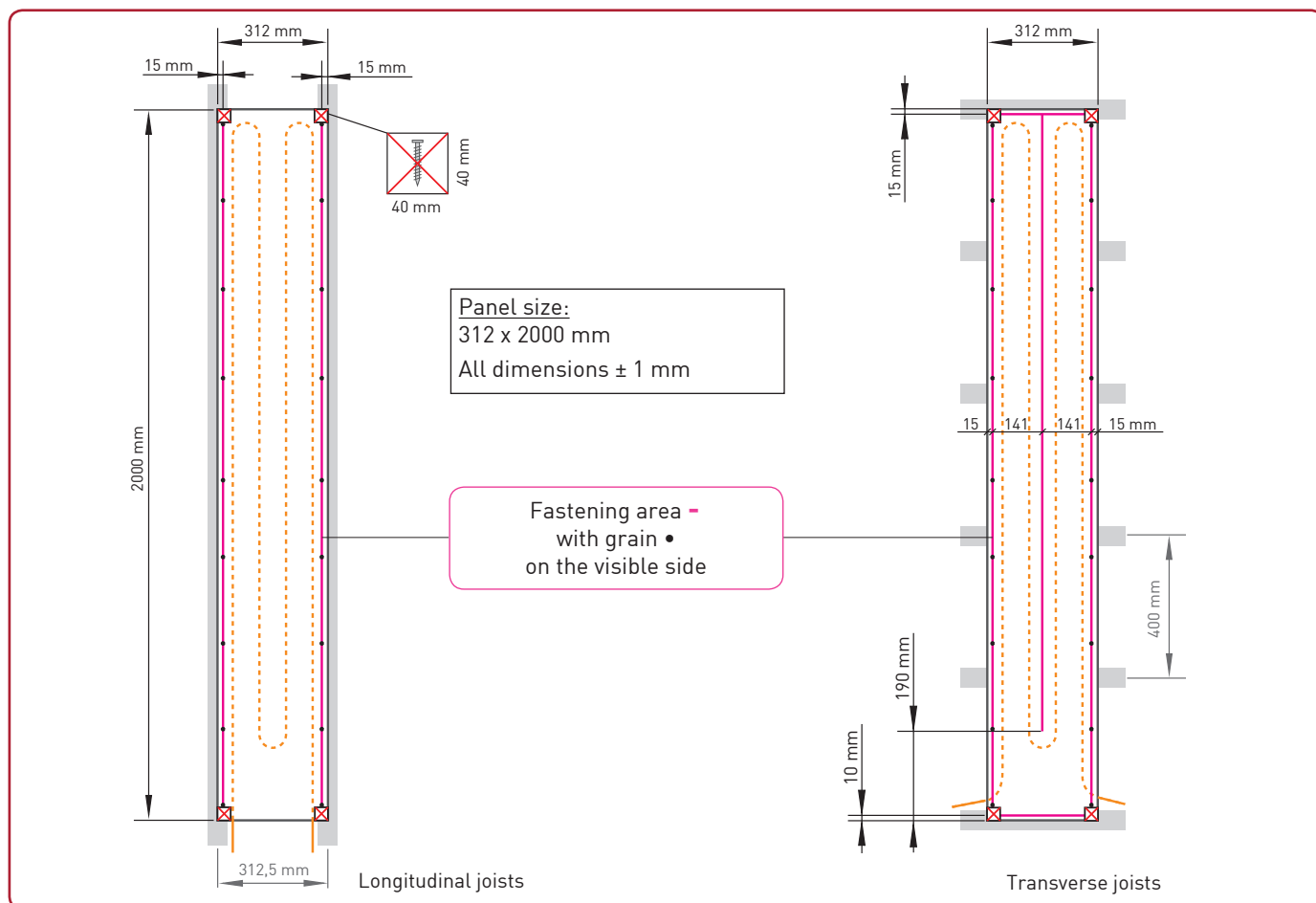
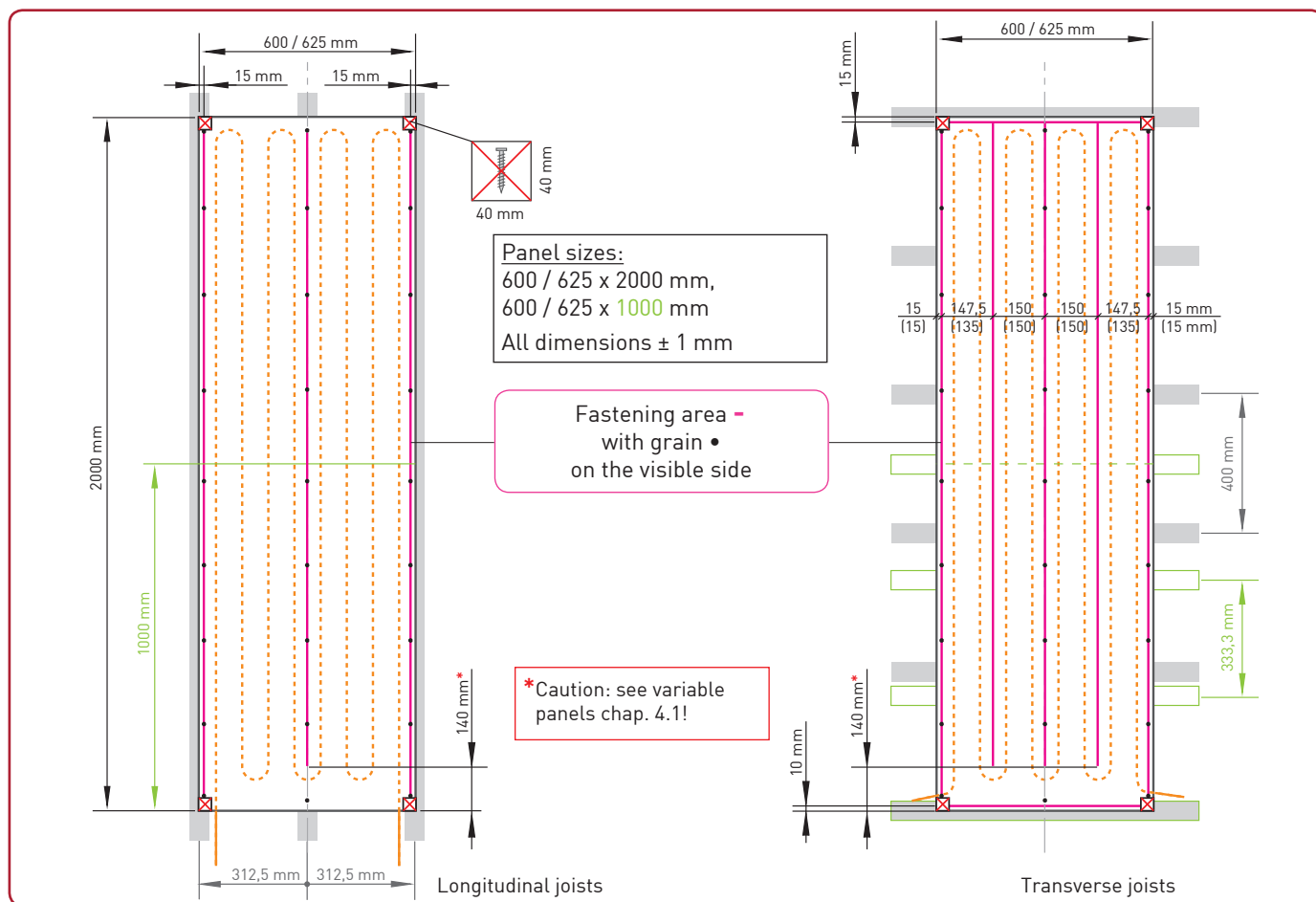
Only part of the panel surface is used as a heating/cooling area, the unused area (grey) can be individually cut to size.

Part No.	Colour code	Product code	h [mm]	w [mm]	A [m ²]	Height h _v [mm]	Heating/Cooling area A _{HC} [m ²]	Weight/panel	Required quantity ^{1) 2)} of FERMACELL screws 3.9 x 40 mm	
									Longitudinal joists	Transverse joists
V020-100		MSWC-2000-625	2000	625	1.25	-	1.25	24.6 kg	3 x 9 pcs.	6 x 5 pcs.
V020-101		MSWC-2000-600	2000	600	1.20	-	1.20	23.6 kg		
V020-102		MSWC-1000-625	1000	625	0.63	-	0.63	12.5 kg	3 x 5 pcs.	4 x 5 pcs.
V020-103		MSWC-1000-600	1000	600	0.60	-	0.60	12.0 kg		
V020-104		MSWC-2000-312	2000	312	0.62	-	0.62	12.3 kg	2 x 9 pcs.	6 x 3 pcs.
V020-120		MSWC-1000-625-V300	1000	625	0.63	300	0.48	12.3 kg	3 x 5 pcs.	4 x 5 pcs.
V020-121		MSWC-1000-600-V300	1000	600	0.60	300	0.46	11.9 kg		
V020-122		MSWC-2000-625-V200	2000	625	1.25	200	1.17	24.8 kg	3 x 9 pcs.	6 x 5 pcs.
V020-123		MSWC-2000-600-V200	2000	600	1.20	200	1.12	24.0 kg		
V020-124		MSWC-2000-625-V400	2000	625	1.25	400	1.04	25.1 kg		
V020-125		MSWC-2000-600-V400	2000	600	1.20	400	1.00	24.3 kg		
V020-126		MSWC-2000-625-V600	2000	625	1.25	600	0.92	25.4 kg		
V020-127		MSWC-2000-600-V600	2000	600	1.20	600	0.88	25.6 kg		
V020-128		MSWC-2000-625-V800	2000	625	1.25	800	0.79	25.8 kg		
V020-129		MSWC-2000-600-V800	2000	600	1.20	800	0.76	25.0 kg		

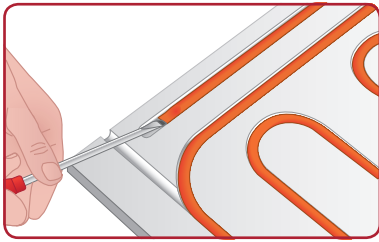
¹⁾ Apart from the quantity, in the case of fire protection requirements test verification/certification may result in different specifications!

²⁾ Spread out bolts evenly across the length/width of the panel.

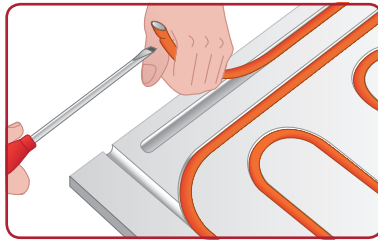
4.2 Fastening area of the ModuleStandardPanels-Classic:



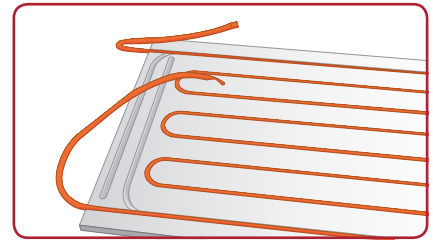
4.3 ModulePanels - Fold out the pipe



Remove the Variomodular pipe from the "parking position"....

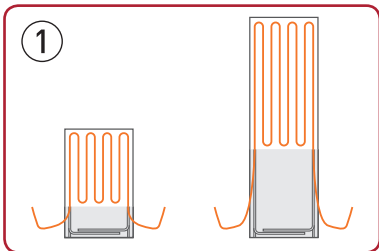


....

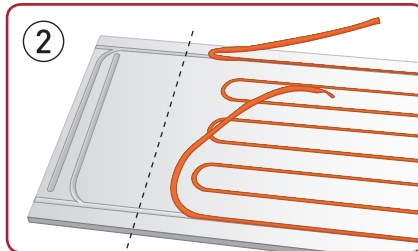


.... and insert it into the groove along the long side of the panel.

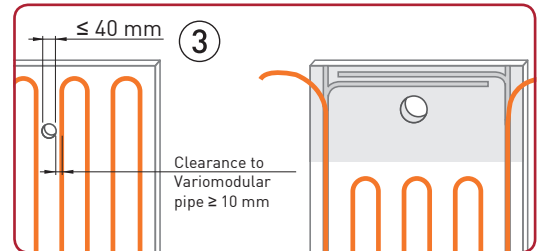
4.4 ModulePanels - Cut to size



Fold out the Variomodular pipe.



Cut the ModulePanel straight (preferably using a circular saw with vacuum attachment).



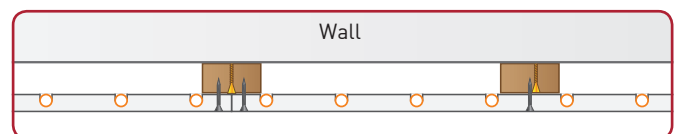
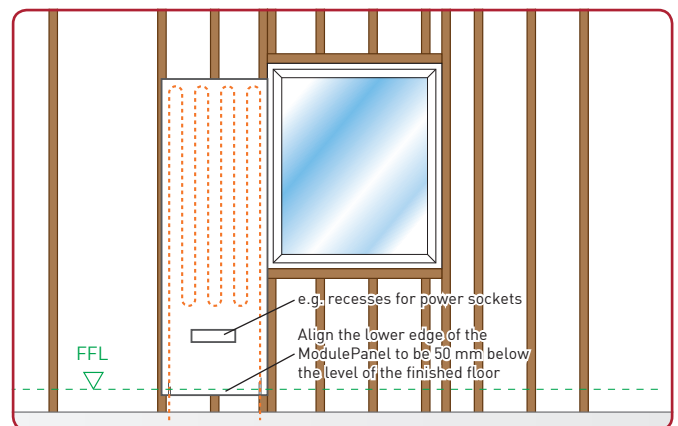
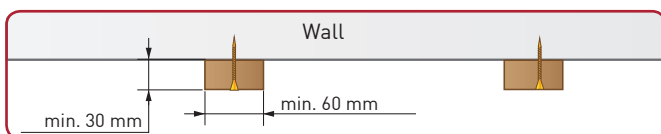
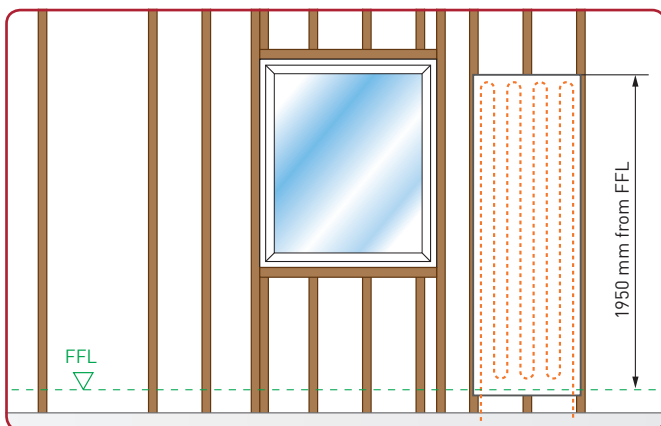
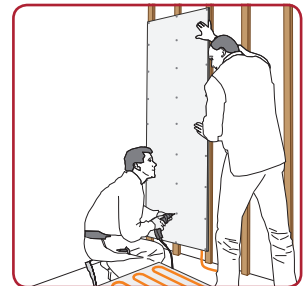
If necessary, drill a hole for ducting (e.g. lighting cables), max. 40 mm diameter.

4.5 Installing the first ModulePanel

Please observe the information in chapter 3 - Substructure - before fastening the ModulePanels.

Align the lower edge of the ModulePanel to be level (spirit level), 50 mm below the level of the finished floor.

The ModulePanels are installed with the rear side (pipe side) on the substructure, so that the Variomodular pipes are no longer visible after installation (apart from the folded-out connection pipe).



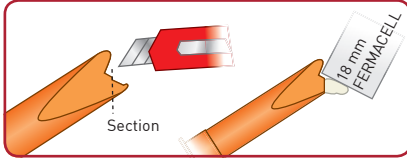
The ModulePanel is fastened at the fastening area - (see chapter 4.1/4.2) using original FERMACELL screws 3.9 x 40 mm or staples.

Tip: Use a power screw gun if possible and set the penetration depth of the screw head to approx. 0.1 mm.

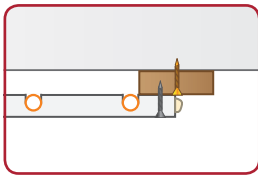
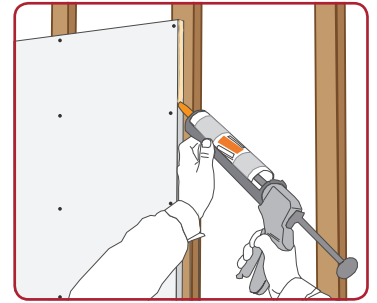


4.6 Joint adhesive

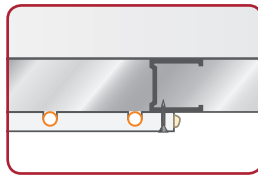
The FERMACELL joint adhesive or FERMACELL joint adhesive Greenline (not suited for factory-provided pre-fabrication) from the cartridge is applied to the dust-free vertical edge of the panel as a flat bulge (width approx. 14 mm). The working temperature of the adhesive should be $> +10^{\circ}$, the room temperature should be $> +5^{\circ}\text{C}$.



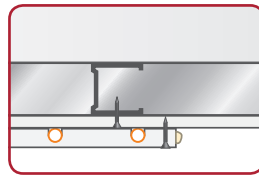
Tip: Cut off the cartridge tip as shown in the illustration.



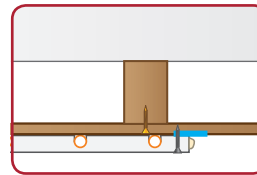
Single-layer



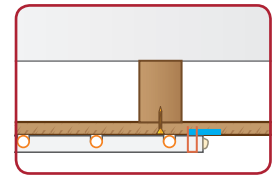
Single-layer



With Fermacell panel substructure (see chapter 3.2)

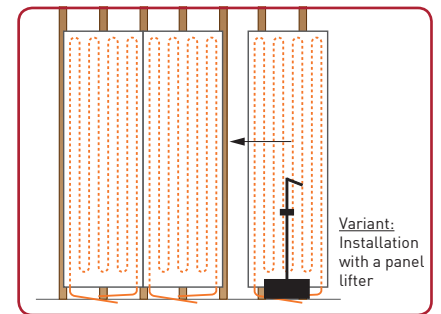
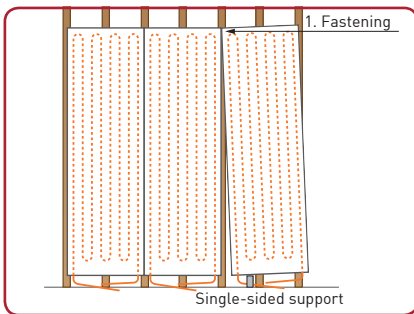


Separating layer for abutting seams when using a horizontal recessed formwork substructure (see chapter 3.5)



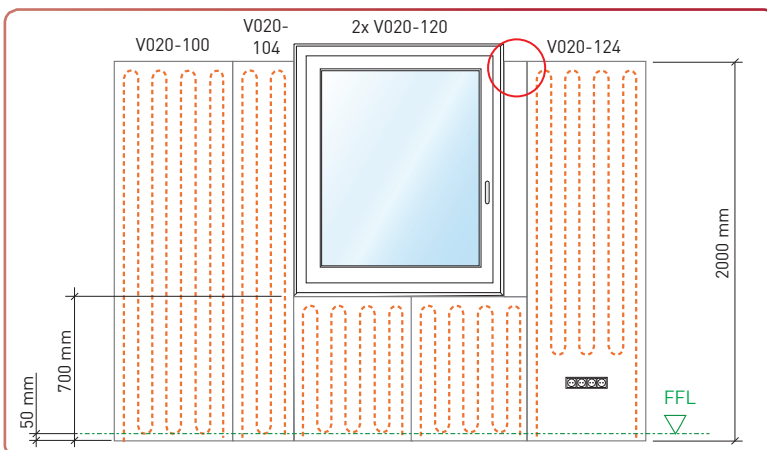
Separating layer for abutting seams when using chipboard panels and full cladding substructure (see chapter 3.4)

4.7 Installing the remaining ModulePanels

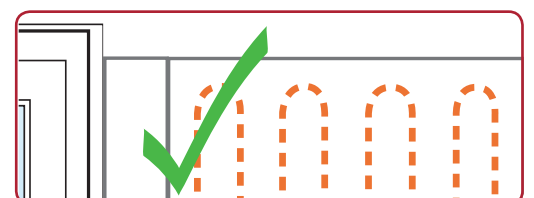
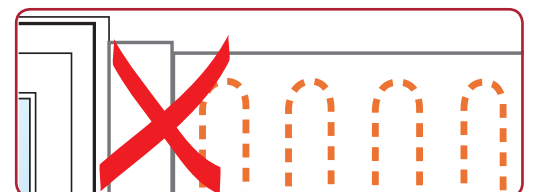


One side of the second ModulePanel is laid under so that the panel edges at the top touch each other and a small wedge-shaped gap exists downwards between the two panels. Fasten the ModulePanel to the substructure at the uppermost screw marking (corner) using a FERMACELL dry wall screw.

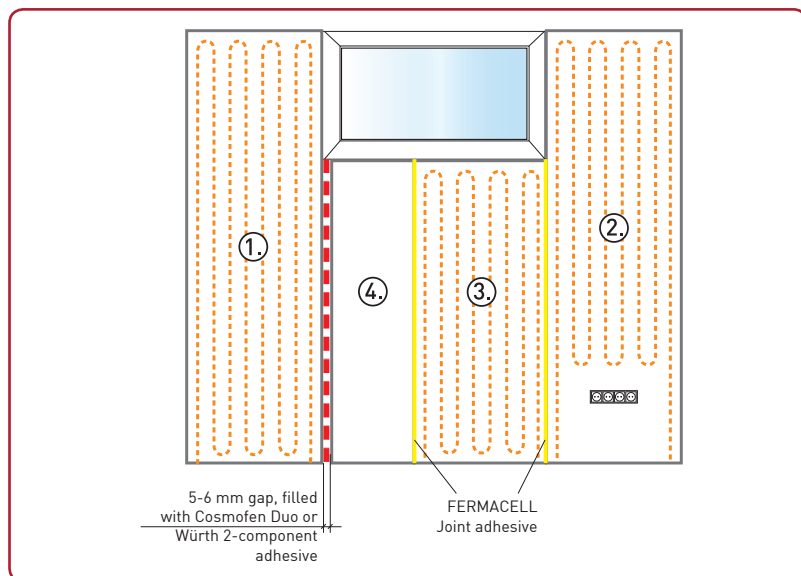
After this, the second ModulePanel is pressed against the first ModulePanel so that the seam is closed. The seam width must not exceed 1 mm. Now screw or staple the ModulePanel at the fastening area - (see chapter 4.1/4.2).



Check the abutting seam of the panels:



4.8 Installation of panels between already installed FERMACELL panels

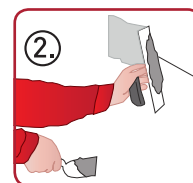
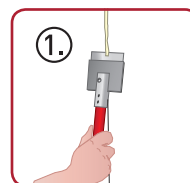


If "drop to drop" installation of the ModulePanels is not possible, proceed as follows:

- Glue ④ one side of the panel using FERMACELL joint adhesive
- Leave a 5-6 mm gap (to the panel ①). This is completely filled with Cosmofen Duo or Würth 2-component adhesive.

4.9 Work to be performed after hardening of the joint adhesive

The joint adhesive hardens after approx. 18 to 36 hours, depending on the room temperature, and the excess joint adhesive is then scraped off. This can be done using (e.g.) an adhesive scraper or wooden chisel (1.). Attempting to remove joint adhesive that is still soft will result in smearing. After this, the seam area and recessed fasteners are stopped using FERMACELL grouting stopper (2.).

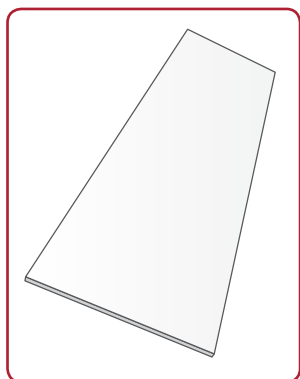


Caution! Stopping must not be performed until all wet work has dried out (wet screed, plastering work, etc.) (see also 5.1)!

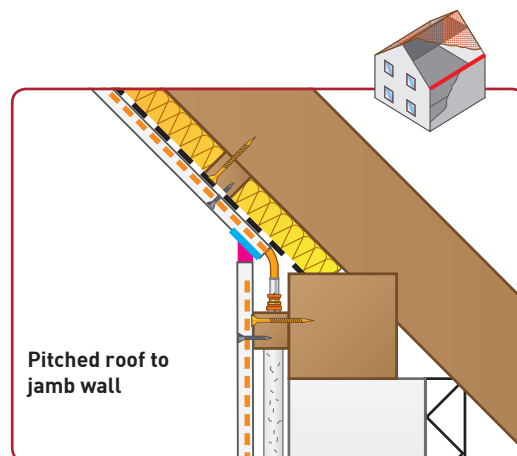
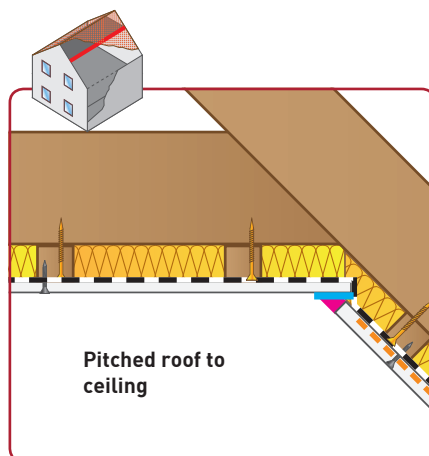
4.10 Transitions to other surfaces

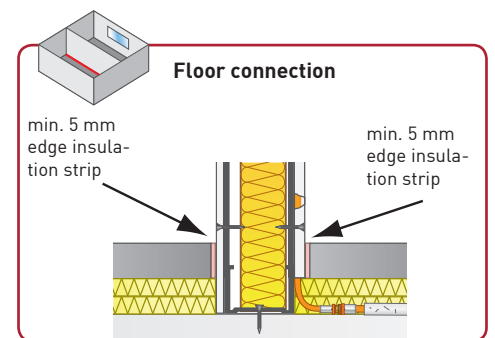
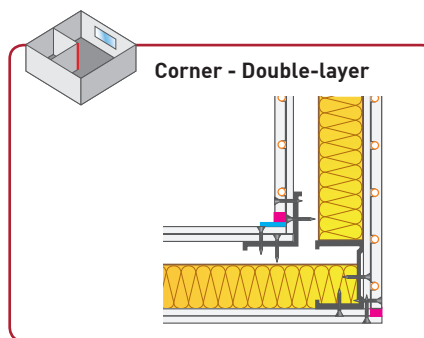
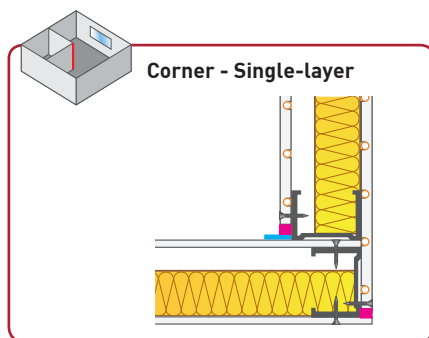
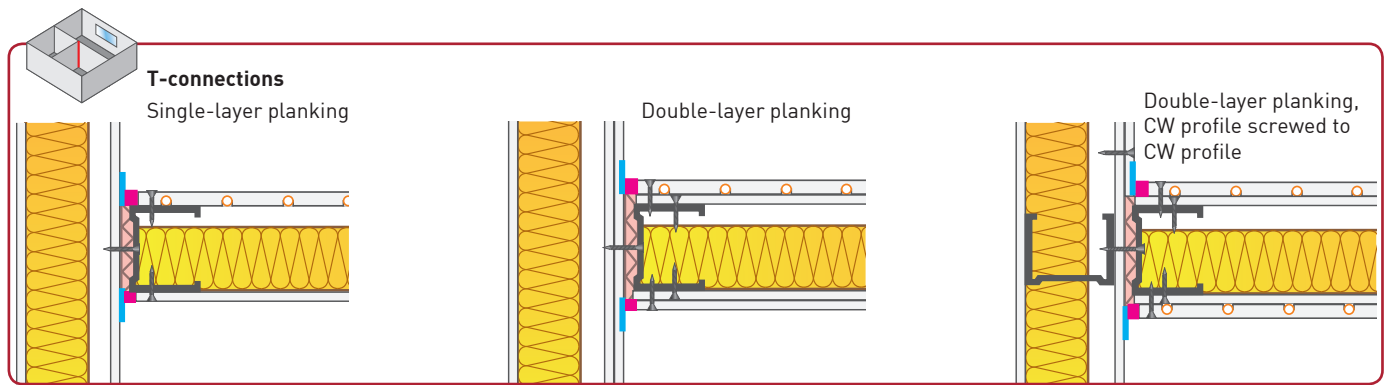
ModulePanel to ModulExpansionPanel:

The areas at the sides of the ModulePanels are filled out using ModulExpansionPanels, with offset seams (please observe the FERMACELL guidelines). The ModulExpansionPanels are also glued with FERMACELL joint adhesive on the front side. Cut panel edges (circular saw) must always be cleaned of all dust immediately before applying the joint adhesive. Cross joints are to be avoided. Inner and outer corners and T-joints are to be constructed as grouted joints (approx. 7 mm) ■ with a separating layer ■ (decoupled connection).

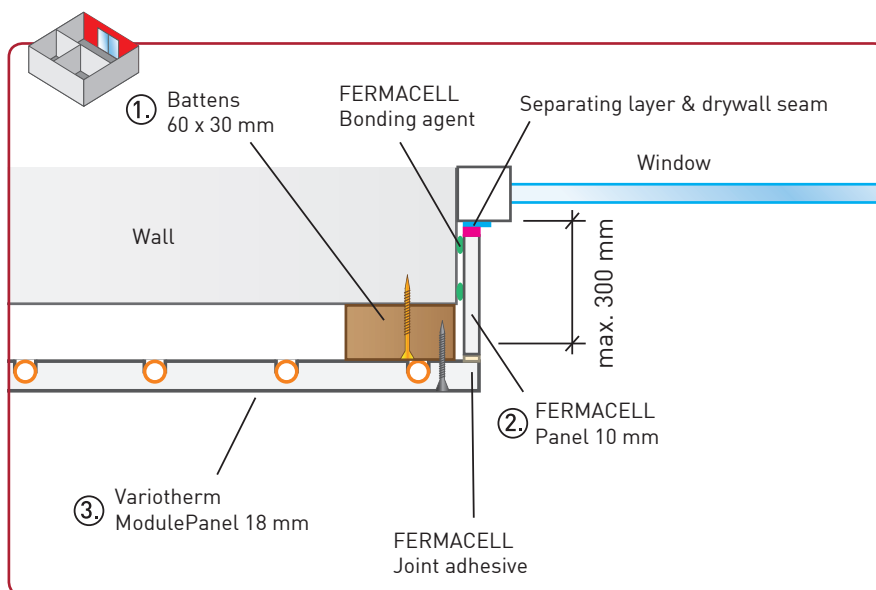


ModulExpansionPanel



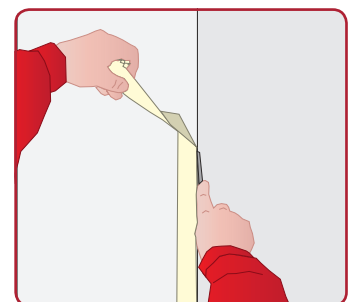


Drywall seam (approx. 7 mm) ■ Separating layer ■



Caution!

Pay special attention to the Vario-modular pipes when fastening the ModulePanels in the reveal area.



Remove the excess separating layer (adhesive tape) at the inner corners after stopping.

ModulePanel to plasterboard panels:

Variotherm provides no guarantee for transitions to products from other panel manufacturers.

Please observe the specifications of the respective (panel) manufacturer.

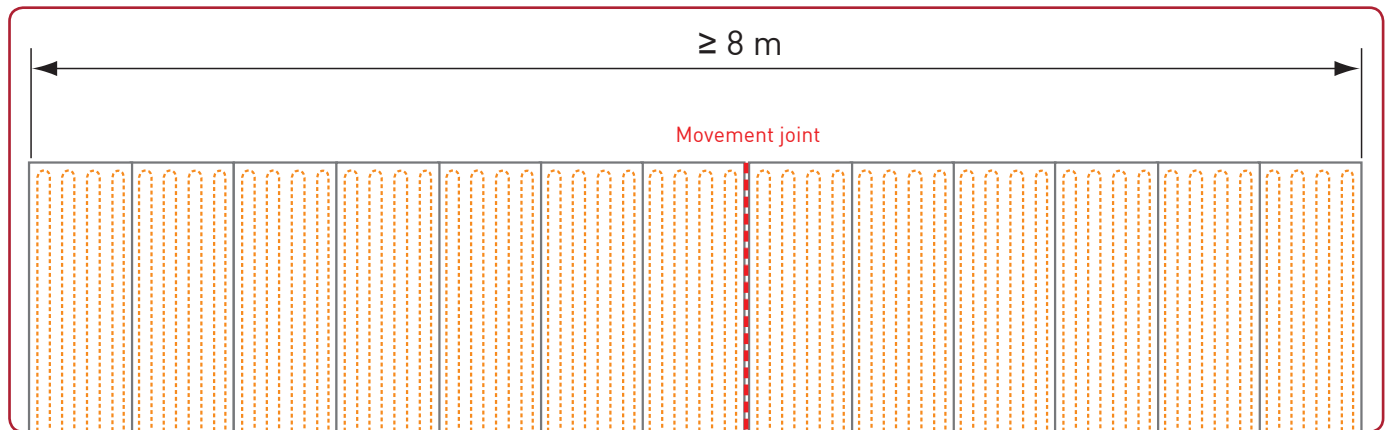
We can however provide you with four practical examples of transition methods:

- Drywall seam (approx. 7 mm) ■ with separating layer ■ → Advantage: intentional straight crack (usually hardly visible)
- Elastic seam (acrylic mass)
- Fascia
- Wooden strip fastened on one side for covering the transition

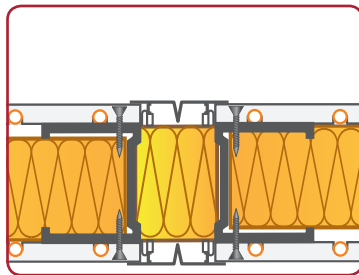
Movement joints:

Movement joints are to be provided every 8 m in wall constructions and pitched roofs.

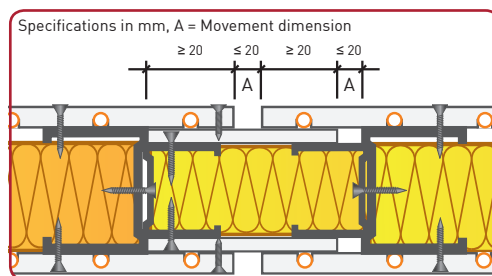
Caution! Pay special attention to the Variomodular pipes when fastening the ModulePanels in the area of the movement joints!



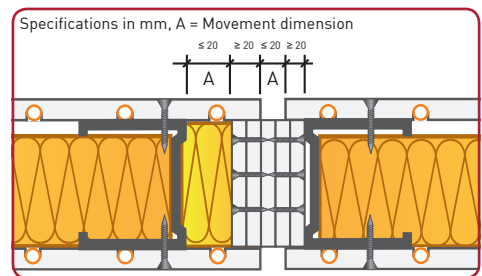
Movement joint at (e.g.) 13x V020-100 ($13 \times 0.625 \text{ m} = 8.13 \text{ m}$)



Movement joint with additional profile



Movement joint with panel strip



Movement joint with strip bundle

4.11 Connecting the Variotherm pipes (press-connection)

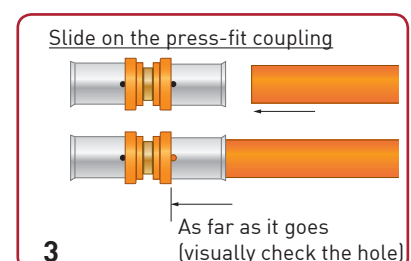
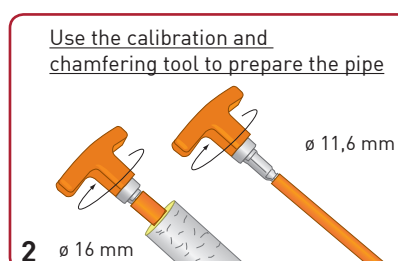
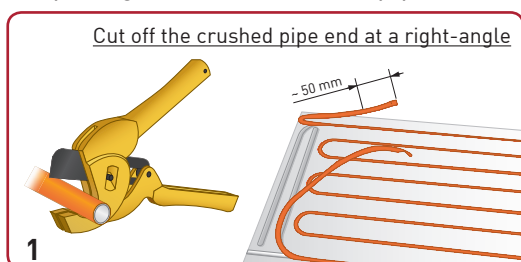
Once the panels and the heating/cooling distribution manifolds are installed, the panels are connected to the desired circuits. The pre-insulated Variomodular pipe 16x2 is used as the supply pipe.

Caution! A lasting, tight connection is only guaranteed if original Variotherm system components are used:

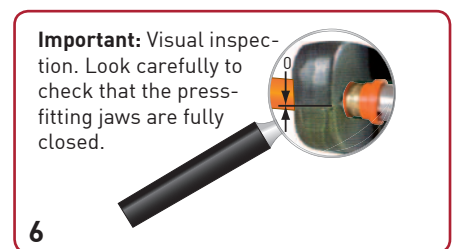
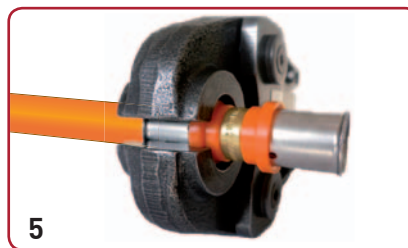
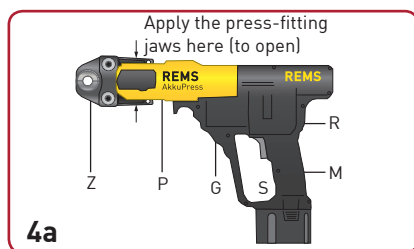
- VarioProFile pipe 16x2 Laser or Variomodular pipe 11.6x1.5 Laser
- Variotherm calibration and chamfering tool
- Variotherm press-fit coupling and Variotherm pressing tool

Maintenance

The press-fitting jaws and pressing tool must be checked at least once a year for correct operation by REMS or an authorised REMS customer service workshop.

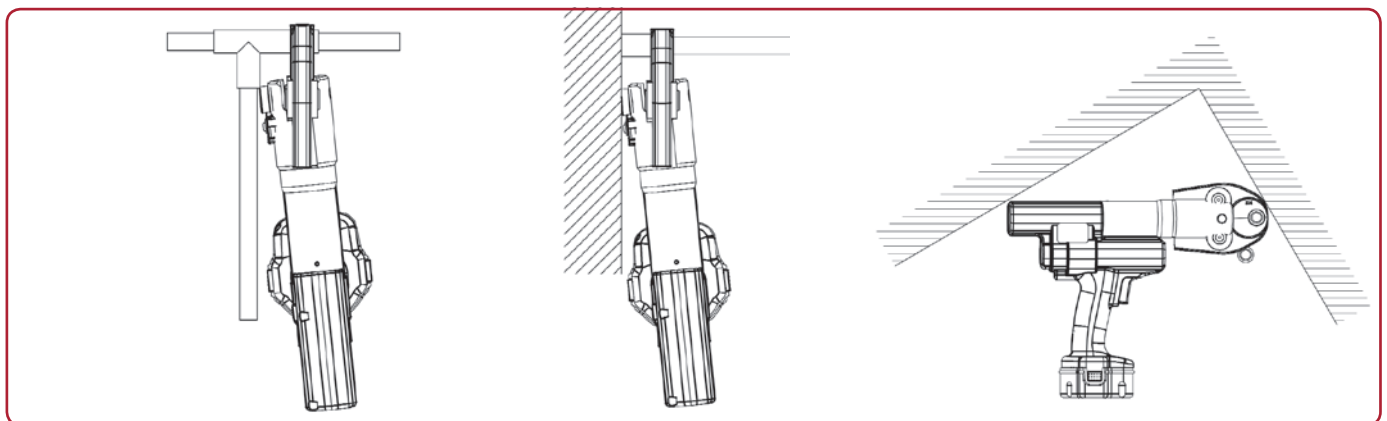
Preparing the Variomodular pipe:

Pressing procedure for AkkuPress 4a

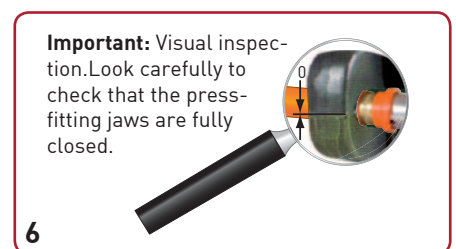
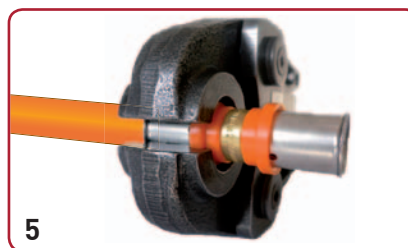
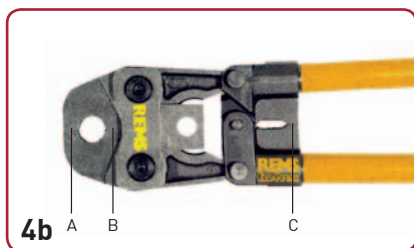


- Push the press-fitting jaws (Z) together by hand (causing the press-fitting jaws to open) far enough so that the press-fitting jaws can be placed over the press-fit coupling **(5)**. Place the pressing tool with press-fitting jaws on the press-fit coupling at a right angle to the pipe axis.
- Release the press-fitting jaws so that they close around the press-fit coupling **(5)**.
- Hold the pressing tool at the housing grip (G) and at the motor grip (M). Hold the switch (S) pressed until the press-fitting jaws are fully closed. This is made apparent by an audible click **(6)**.
- Press the reset lever (R) until the pressing rollers (P) have retracted completely. Press the press-fitting jaws (Z) together by hand so that the jaws can be removed from the press-fit coupling (see also the REMS AkkuPress operating manual).

The following situations must be avoided (danger of gearbox breakage!)

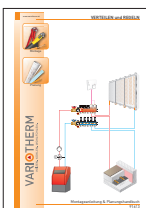
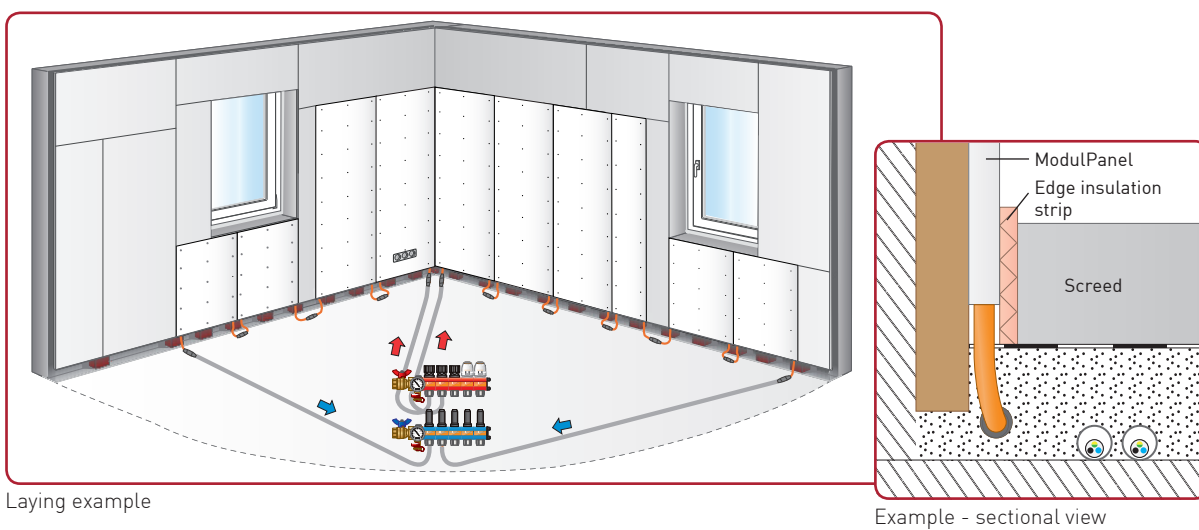
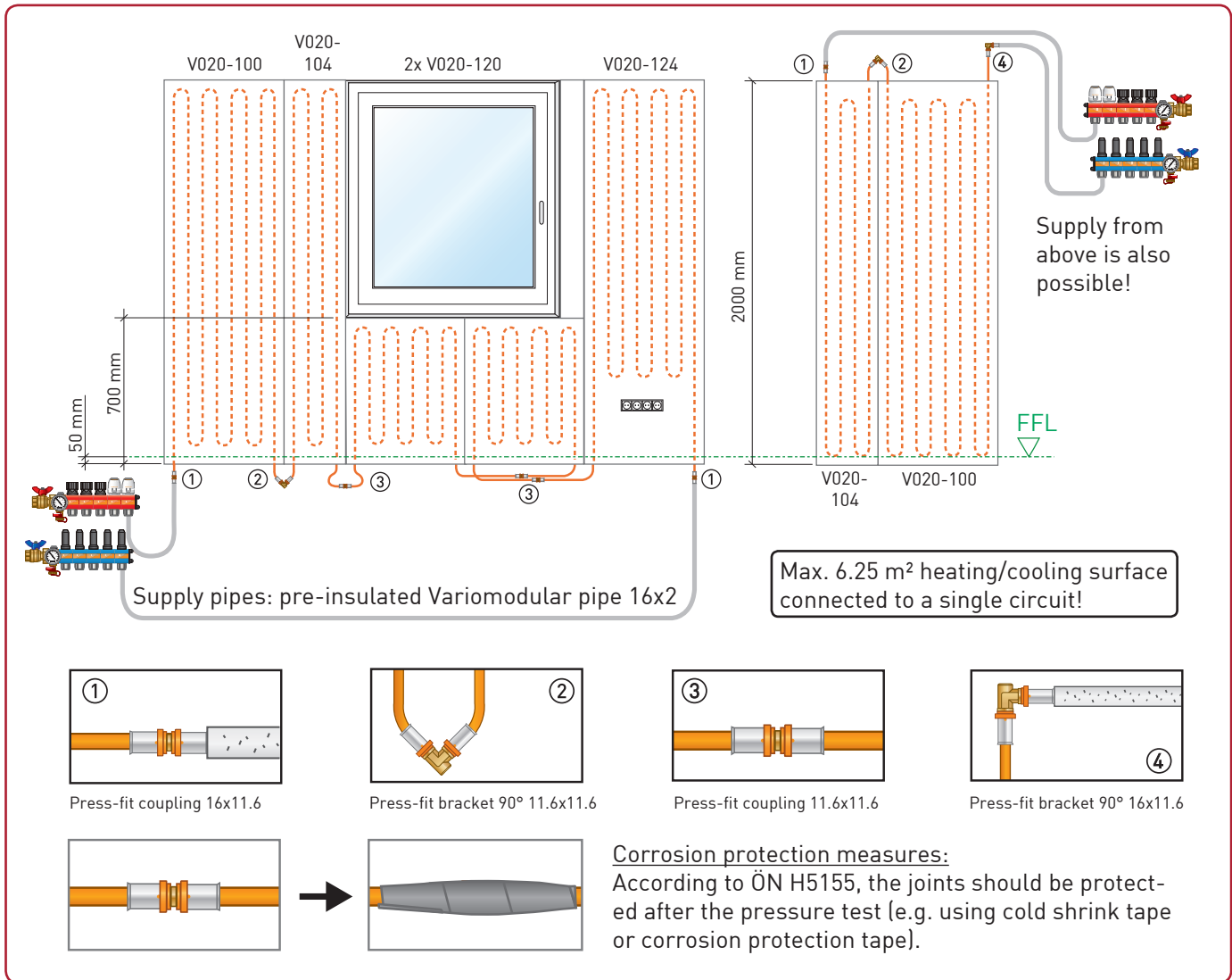


Pressing procedure for Eco-Press 4b



- The pressing tool's lever length can be adjusted to suit the pressing force and the available space on site. Use provided pipe arms with sleeve sockets for extension. Always screw pipe arms tight before use (danger of accidents!). Secure the selected press-fitting jaws with plug-in bolts.
- Pull the pipe arms far enough apart (press-fitting jaws open) so that the press-fitting jaws can be slid over the press-fit coupling **(5)**. Place the press-fitting jaws on the press-fit coupling at a right angle to the pipe axis.
- Push pipe arms together until they reach the stop position (C) (a click is heard when they reach the stop). Only once the press-fitting jaws are fully closed at (A) and at (B) is a correct press connection realised. → Visual check **(6)**.
- Re-open the pipe arms so that the jaws can be removed from the press-fit coupling (see also the REMS Eco-Press operating manual).

Press-fit connection possibilities:



"DISTRIBUTION and CONTROL"

Details regarding the system and heating circuit pipes and the room temperature control are provided in the "DISTRIBUTION and CONTROL" planning and installation instructions.

5. Further finishing of the ModulePanel surface

5.1 Stopping

After installation, the ModulePanels and the FERMACELL panels without pipes are stopped using FERMACELL grouting or fine stopper. The following work is to be performed, depending on the surface quality required:

Q1	• Stopping of visible joints and adhesive seams with FERMACELL grouting.
Q2	• Q1 + burr-free and step-free stopping of the seams and joints
Q3	• Stopping of the visible joints with FERMACELL grouting or plaster. • Wide stopping of the seams • Full-surface coating and sharp pulling-off using FERMACELL grouting or fine stopper or other suitable stopping material.
Q4	• Stopping of the visible joints with FERMACELL grouting or plaster. • Wide stopping of the seams • Full-surface coating and smoothing using FERMACELL fine stopper or plaster or other suitable stopping material.

5.2 Painting

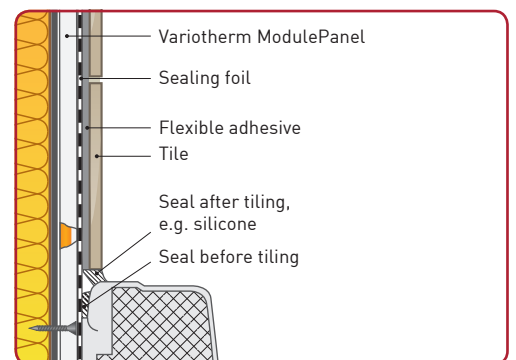
Commonly available paints such as (e.g.) latex, emulsion or enamel paint can be applied to the ModulePanels. Mineral-based paints such as (e.g.) limewash and silicate paints must be approved by the manufacturer for use on gypsum fibreboards. The paint is usually applied in two steps.

5.3 Tiling

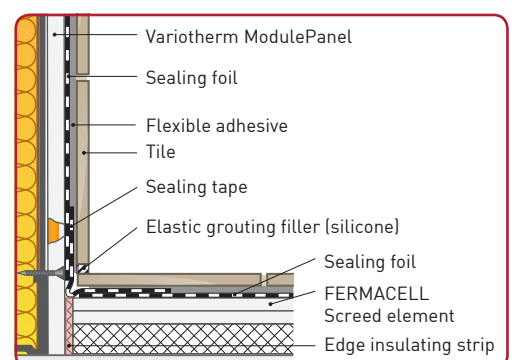
See also the appropriate standards for laying tiles, panels and mosaics.

Points to be observed:

- The weight of the tiles (incl. adhesive) must not exceed 56 kg/m².
- The surface of the ModulePanels must be dust-free.
- The moisture content of the ModulePanels must be less than 1.3 % (min. 48 h at 70 % humidity and room temperature > 15 °C).
- Sealing systems must be used on surfaces subject to the effects of moisture (see page 22). The wall boundaries must be sealed using appropriate sealing tape.
- A flexible adhesive is used to bond the tiles. A primer must be applied if this is stated by the adhesive manufacturer. This is particularly the case for flexible cement adhesives.
- Flexible grouting mortar must be used for grouting.
- After laying the tiles, boundaries with the walls are additionally sealed with silicone.






Connections between shower or bath and Variotherm ModulePanels



Wall-screed structure in areas subjected to water loads

Use of primer and sealing system:




Loading group (as per ÖNORM B 2207)	Which room?	Adhesive mortar with tile cladding	Sealing system	Primer
W1	Residential sector: toilets, corridors, staircases	Calcium sulphate flexible adhesive mortar	Not required	Not required
W2 	Residential sector: Kitchen Commercial area: toilet systems	Only cement flexible adhesive mortar	Recommended	In addition to sealing system if recommended by the manufacturer.
W3 	Residential sector: spray water areas In showers and bathrooms	Only Cement flexible adhesive mortar	Required	In addition to sealing system if recommended by the manufacturer.
W4 	Commercial sector: Kitchen, showers	No ModuleStandardWall possible.		

Product examples for primer or sealing system:

Manufacturer/Brand	Primer	Sealing system
FERMACELL	Deep primer	Liquid foil
Ardex	Ardex P51	Ardex 8 + 9
Murexin	Deep primer LF1	Shower sealant / Liquid foil 1KS
Cimsec	Plaster primer	Flexible sealant DU15
PCI	Gisogrund	Lastogum
Schönox	Schönox KH	Schönox HA or 1K-DS
Mapei	Primer G	Mapegum WPS
Weber	weber.prim 801	weber.sys 822
Ceresit	Solvent-free deep primer	Ceresit shower & bath sealant

5.4 Fastening loads to the ModuleStandardWall

Single loads hanging on the wall



Picture hooks ¹⁾ fastened with nails	Permissible loads per hook on ModulePanel ²⁾ 18 mm (\triangle 12,5 mm FERMACELL panel), (100 kg = 1 kN)
	0.17 kN
	0.27 kN
	0.37 kN

¹⁾ Breaking force of the hooks per brand. Hooks fastened corrosion-neutral only in the planking

²⁾ Safety factor 2 (constant load at rel. humidity up to 80 %)

Light single loads parallel to the wall surface with low outreach- es, such as (e.g.) pictures or decorations, can be fastened directly to the FERMACELL planking using commonly available fasteners without using an additional substructure. Suitable for this are (e.g.) nails, picture hooks with single or double nail mounts, or screws and dowels.

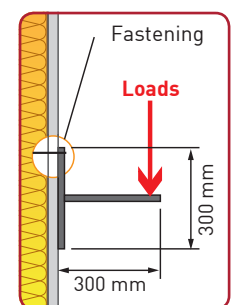
Cabinet loads on vertical FERMACELL planking¹⁾

Cabinet loads fastened with dowels or screws	Permissible loads for individual hanging on ModulePanel ²⁾ 18 mm (\triangle 2,5 mm FERMACELL panel), (100 kg = 1 kN)
	0.50 kN
	0.30 kN

¹⁾ Introduced as per DIN 4103, safety factor 2

²⁾ Observe the instructions of the dowel manufacturer.

The listed loading values can be added when the dowel clearance is ≥ 500 mm. At lower dowel clearances, 50 % of the respective maximum permissible load for each dowel is used. The sum of the individual loads must not exceed 1.5 kN/m for walls and must not exceed 0.4 kN/m for free-standing single wall panels and double stud walls that are not connected to each other. Higher loads must be specially checked and approved.



Introduction of the loads

6. Leak-tightness test & preheating protocol

Construction project: _____

Building owner/ Occupant: _____

Client: _____

Heating installation technician: _____

Architect: _____

Other: _____

Leak-tightness test

After installation and before completion work (plastering, painting, wallpapering, tiling), the circuits of the Variotherm ModuleWall are to be checked for leak-tightness via a water pressure test. The test pressure should be min. 4 bar and max. 6 bar. If there is a risk of freezing, appropriate measures should be taken, e.g. use of antifreeze and controlling the building's temperature.

- Installation of ModulePanels finished on: _____
- Installation of pipe connections finished on: _____
- Pressure test started on: _____ with test pressure ____ bar
- Pressure test finished on: _____ with test pressure ____ bar
- Start of completion work (plastering, painting, wallpapering, tiling) on: _____
- System pressure during the completion work was ____ bar
- The system water was treated (e.g. per ÖNORM H5195-1) ☐ Yes ☐ No
- Antifreeze was added to the system water ☐ Yes ☐ No
- The system was checked for leak-tightness on: _____ and approved

Approval:

Building owner/Occupant/Client

Construction management/Architect

Heating installation technician

Preheating Protocol

Preheating of the Variotherm ModuleWall

- Completion work finished on: _____
- Preheating started on: _____
- Supply temperature set to 23 - 30 °C and retained for 1 day completed ☐
- Increase to a supply temperature of 30 - 40 °C and maintained for ½ day completed ☐
- Set to maximum calculated supply temperature plus 5 °C completed ☐
- (Caution: The maximum supply temperature of the ModuleWall is: 50 °C)
- Maintained for ½ day, set falling supply temperature to 30 °C, maintain for 1 day completed ☐
- Heating switched off on: _____
- Operating state and outdoor temperature on handover:

Approval:

Building owner/Occupant/Client

Construction management/Architect

Heating installation technician

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