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DRYWALL CEILING COOLING/HEATING SYSTEM

Installation

ERM

ARISTH HEATING. COOLING. C

COMFORT

ModuleStandardCeiling.



Installation instructions e44912

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1.Safety information

1.1 Regulations

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 cooling/heating 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 ModulePanels, 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. For reasons of comfort, do not exceed $t_{mH} = 35$ °C (t/t_r = 40/30 °C) with the ModuleStandardCeiling.

Cooling ceiling: The surface temperature should not reach or fall below the dew point temperature.

 $t_{\rm w}/t_{\rm r}$ = flow/return temperature, $t_{\rm mH}$ = mean hot water temperature = $\frac{t_{\rm v}/t_{\rm r}}{2}$



You can find further details on this in the design manual: 'HEATING OUTPUT / COOLING CAPACITY'

1.5 Variomodular pipe 11.6x1.5 Laser



The Variomodular pipe 11.6x1.5 Laser is an aluminium multi-layer composite pipe (100% oxygen diffusion-tight). It is pre-integrated in the ModulePanels. In order to prevent the Variomodular pipe 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 16x2 Laser



As a supply pipe to the ModuleStandardCeiling, the pre-insulated Variomodular pipe 16x2 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 ModuleStandardPanels-Classic 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 FERMA-CELL fire protection assessments. The Variotherm ModuleStandardPanels-Acoustic provide <u>no fire protection</u>!

1.8 Room ambient humidity

The relative humidity must not exceed 70% during storage, installation and additional processing of the ModulePanels and during the construction phase and normal use of the building. Wet plaster and wet screed must be applied and have dried before installation of the ModulePanels.

1.9 Suspension system

Suspended elements such as (e.g.) lighting must only be attached to the substructure and <u>not</u> to the ModulePanels. These loads are to be taken into account when installing the substructure (see chapter 3).

1.10 Visible side/rear side of the ModulePanel



The ModulePanels are installed so that the integrated Variomodular pipes are <u>not</u> 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





Fastening tools



Power screw gun, preferable with latching depth stop



Plane for visible edges



Hole saw



Ladder



Ceiling supports

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

Cartridge gun for joint adhesive



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)



2.4 Other work documents

Please also observe the latest FERMACELL

planning and installation instructions!

Clean buckets

Trowel and plastering knife



Adhesive scraper







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 ceiling construction.

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 or DIN EN 14195.

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 additional loads (e.g. ceiling lights).

Caution: Do not glue the ModulePanels directly to the ceiling (plaster).

Additional loads such as ceiling lights, multi-layer planking and other fittings must also be taken into account! These must not be directly hung on the ModulePanel.

3.1 Wooden substructure -directly fastened base runners





Cross joists longitudinal to the ModulePanels

Cross joists transverse to the ModulePanels

| | Joist dimensions w x h [mm] | Max. permissible span for loads of up to 30 kg/m ² ≜ ModulePanel (20.5 kg/m ²) + light additional load (up to 9.5 kg/m ²) | Max. permissible span for loads of up to 50 kg/m² ≙ ModulePanel (20.5 kg/m²) + heavy additional load (up to 29.5 kg/m²) | Dimen- sions as per diagram |
|------------------------------------|--------------------------------|--|---|-----------------------------------|
| | Main joists 48 x 24 | 650 mm | 600 mm | |
| Max. clearance | Main joists 50 x 30 | 750 mm | 600 mm | а |
| | Main joists 60 x 40 | 850 mm | 700 mm | |
| | Cross joists 48 x 24 | 600 mm | 500 mm | |
| Max. axıs clearance main joists | Cross joists 50 x 30 | 750 mm | 600 mm | b |
| | Cross joists 60 x 40 | 1000 mm | 900 mm | |

| Panel size h x w [mm] | | ModuleS | tandardPane | l-Classic | | ModuleSt | Dimen- | | |
|---|-----------------------|-------------|-----------------------|---------------|-------------|-----------|------------|------------|-------------------------|
| | 2000 x 625 | 2000 x 600 | 1000 x 625 | 1000 x 600 | 2000 x 312 | 750 x 625 | 1000 x 625 | 1250 x 625 | sions as per diagram |
| Max. axis clearance [mm] longitudinal cross joists | 625 312.5 ∛ | 600 300∛ | 625 312.5 % | 600 300∛ | 312 312∛ | 625 | 625 | 625 | х |
| Max. axis clearance [mm] transverse cross joists | 500 400∛ | 500 400∛ | 500 333.3∛ | 500 333.3∛ | 500 400∛ | 375 | 333.3 | 416.7 | у |

👋 In the case of fire protection requirements, except where test verification/certification is otherwise specified

3.2 Wooden substructure - suspended base runners



Cross joists longitudinal to the ModulePanels



Cross joists transverse to the ModulePanels

| | Joist dimensions w x h [mm] | Max. permissible span for loads of up to 30 kg/m ² ≜ ModulePanel (20.5 kg/m ²) + light additional load (up to 9.5 kg/m ²) | Max. permissible span for loads of up to 50 kg/m² ≙ ModulePanel (20.5 kg/m²) + heavy additional load (up to 29.5 kg/m²) | Dimen- sions as per diagram |
|---------------------|--------------------------------|--|---|-----------------------------------|
| Max. clearance | Main joists 30 x 501) | 850 mm | 700 mm | |
| suspension element | Main joists 40 x 60 | 1000 mm | 850 mm | а |
| | Cross joists 48 x 24 | 600 mm | 500 mm | |
| Max. axis clearance | Cross joists 50 x 30 | 750 mm | 600 mm | b |
| | Cross joists 60 x 40 | 1000 mm | 900 mm | |

 $^{\rm 1]}$ Only in conjunction with cross joists that are 50 mm wide and 30 mm high

| Panel size | | ModuleS | tandardPane | l-Classic | | ModuleSt | Dimen- | | |
|---|-----------------------|-------------|-----------------------|---------------|-------------|-----------|------------|------------|-------------------------|
| h x w [mm] | 2000 x 625 | 2000 x 600 | 1000 x 625 | 1000 x 600 | 2000 x 312 | 750 x 625 | 1000 x 625 | 1250 x 625 | sions as per diagram |
| Max. axis clearance [mm] longitudinal cross joists | 625 312.5 ∛ | 600 300∛ | 625 312.5 ∛ | 600 300∛ | 312 312∛ | 625 | 625 | 625 | х |
| Max. axis clearance [mm] transverse cross joists | 500 400∛ | 500 400∛ | 500 333.3∛ | 500 333.3∛ | 500 400∛ | 375 | 333.3 | 416.7 | у |

👋 In the case of fire protection requirements, except where test verification/certification is otherwise specified

3.3 Metal substructure - suspended base profile





Support profile transverse to the ModulePanels

| | Profile dimensions ²⁾ w x h [mm] | Max. permissible span for loads of up to 30 kg/m² ≙ ModulePanel (20.5 kg/m²) + light additional load (up to 9.5 kg/m²) | Max. permissible span for loads of up to 50 kg/m² ≙ ModulePanel (20.5 kg/m²) + heavy additional load (up to 29.5 kg/m²) | Dimen- sions as per diagram |
|--------------------------------------|--|--|---|-----------------------------------|
| Max. clearance suspension element | Base profile CD 60 x 27 x 06 | 750 mm | 600 mm | а |
| Max. axis clearance base profile | Support profile CD 60 x 27 x 06 | 1000 mm | 750 mm | b |

²¹ Standard steel sheet profiles (as per ÖNORM/DIN 18182 or ÖNORM/DIN EN 14195).

| Panel size h x w [mm] | | ModuleS | tandardPane | l-Classic | ModuleSt | Dimen- | | | |
|--|---------------|-------------|---------------|---------------|-------------|-----------|------------|------------|---------|
| | 2000 x 625 | 2000 x 600 | 1000 x 625 | 1000 x 600 | 2000 x 312 | 750 x 625 | 1000 x 625 | 1250 x 625 | diagram |
| Max. axis clearance [mm] longitudinal support profile | 625 312.5∛ | 600 300∛ | 625 312.5∛ | 600 300∛ | 312 312∛ | 625 | 625 | 625 | х |
| Max. axis clearance [mm] transverse support profile | 500 400∛ | 500 400∛ | 500 333.3∛ | 500 333.3∛ | 500 400∛ | 375 | 333.3 | 416.7 | у |

👋 In the case of fire protection requirements, except where test verification/certification is otherwise specified

4. Installing the ModuleStandardPanels



4.1 ModuleStandardPanels-Classic - Types

Variable panels:

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. | Product code | h [mm] | w [mm] | A [m²] | Height h _v [mm] | Heating/Cooling area A _{Hc} [m²] | Weight/panel | Weight/m ² | Required quantity of FERMA- CELL screws 3.9 x 40 mm |
|----------|--------------------|-----------|-----------|-----------|-------------------------------|--|--------------|-----------------------|--|
| V020-100 | MSDC-2000-625 | 2000 | 625 | 1.25 | - | 1.25 | 24.6 kg | 19.7 kg | > 19 or 2/ these per full panel |
| V020-101 | MSDC-2000-600 | 2000 | 600 | 1.20 | - | 1.20 | 23.6 kg | 19.7 kg | |
| V020-102 | MSDC-1000-625 | 1000 | 625 | 0.63 | - | 0.63 | 12.5 kg | 19.8 kg | |
| V020-103 | MSDC-1000-600 | 1000 | 600 | 0.60 | - | 0.60 | 12.0 kg | 19.8 kg | |
| V020-104 | MSDC-2000-312 | 2000 | 312 | 0.62 | - | 0.62 | 12.3 kg | 19.8 kg | ≥ 9 or 12 <mark>∛</mark> pcs. per full panel |
| V020-120 | MSDC-1000-625-V300 | 1000 | 625 | 0.63 | 300 | 0.48 | 12.3 kg | 19.6 kg | |
| V020-121 | MSDC-1000-600-V300 | 1000 | 600 | 0.60 | 300 | 0.46 | 11.9 kg | 19.8 kg | |
| V020-122 | MSDC-2000-625-V200 | 2000 | 625 | 1.25 | 200 | 1.17 | 24.8 kg | 19.8 kg | |
| V020-123 | MSDC-2000-600-V200 | 2000 | 600 | 1.20 | 200 | 1.12 | 24.0 kg | 20.0 kg | |
| V020-124 | MSDC-2000-625-V400 | 2000 | 625 | 1.25 | 400 | 1.04 | 25.1 kg | 20.1 kg | |
| V020-125 | MSDC-2000-600-V400 | 2000 | 600 | 1.20 | 400 | 1.00 | 24.3 kg | 20.3 kg | |
| V020-126 | MSDC-2000-625-V600 | 2000 | 625 | 1.25 | 600 | 0.92 | 25.4 kg | 20.3 kg | ≥ 18 or 24 pcs. per full panel |
| V020-127 | MSDC-2000-600-V600 | 2000 | 600 | 1.20 | 600 | 0.88 | 24.6 kg | 20.5 kg | |
| V020-128 | MSDC-2000-625-V800 | 2000 | 625 | 1.25 | 800 | 0.79 | 25.8 kg | 20.6 kg | |
| V020-129 | MSDC-2000-600-V800 | 2000 | 600 | 1.20 | 800 | 0.76 | 25.0 kg | 20.8 kg | |

Maximum heating/cooling area per heating/cooling circuit: 6.25 m² (e.g.: 5 pcs. V020-100)

👋 In the case of fire protection requirements, <u>except where test verification/certification is otherwise specified</u>

Fastening area of the ModuleStandardPanels-Classic:



4.2 ModuleStandardPanels-Acoustic - Types

ModulePanels with different sized holes to improve the acoustic characteristics.



Maximum heating/cooling area per heating/cooling circuit: 6.25 m² (e.g.: 10 pcs. V024-101)

| Part No. | Product code | h [mm] | w [mm] | A [m²] | D [mm] | R [mm] | Heating/Cooling area A _{Hc} [m²] | Weight/panel | Weight/m ² | Required quantity of FERMA- CELL screws 3.9 x 40 mm |
|----------|-------------------|-----------|-----------|-----------|-----------|-----------|--|--------------|-----------------------|--|
| V024-100 | MSDA-0750-625-B04 | 750 | 625 | 0.47 | 4 | 8 | 0.47 | 8.8 kg | 18.7 kg | ≥ 6 pcs. per full panel |
| V024-101 | MSDA-1000-625-B04 | 1000 | 625 | 0.63 | 4 | 8 | 0.63 | 11.6 kg | 18.4 kg | ≥ 8 pcs. per full panel |
| V024-102 | MSDA-1250-625-B04 | 1250 | 625 | 0.78 | 4 | 8 | 0.78 | 14.4 kg | 18.4 kg | ≥ 10 pcs. per full panel |
| V024-103 | MSDA-0750-625-B08 | 750 | 625 | 0.47 | 8 | 16 | 0.47 | 8.7 kg | 18.5 kg | ≥ 6 pcs. per full panel |
| V024-104 | MSDA-1000-625-B08 | 1000 | 625 | 0.63 | 8 | 16 | 0.63 | 11.4 kg | 18.0 kg | ≥ 8 pcs. per full panel |
| V024-105 | MSDA-1250-625-B08 | 1250 | 625 | 0.78 | 8 | 16 | 0.78 | 14.1 kg | 18.0 kg | ≥ 10 pcs. per full panel |
| V024-106 | MSDA-0750-625-B10 | 750 | 625 | 0.47 | 10 | 16 | 0.47 | 8.1 kg | 17.2 kg | ≥ 6 pcs. per full panel |
| V024-107 | MSDA-1000-625-B10 | 1000 | 625 | 0.63 | 10 | 16 | 0.63 | 10.6 kg | 16.8 kg | ≥ 8 pcs. per full panel |
| V024-108 | MSDA-1250-625-B10 | 1250 | 625 | 0.78 | 10 | 16 | 0.78 | 13.0 kg | 16.7 kg | ≥ 10 pcs. per full panel |

Fastening area of the ModuleStandardPanels-Acoustic:



4.3 ModulePanels - Fold out the pipe

The Variomodular pipe is moved out of the "parking position" before fastening the ModulePanels to the substructure.



4.4 Trimming the variable panels / drilling holes



① Fold out the Variomodular pipe.

- ② Cut the ModulePanel straight (preferably using a circular saw with vacuum attachment).
- ③ If necessary, drill a hole for ducting (e.g. lighting cables).

For holes between the pipes: max. hole diameter 40 mm.

4.5 Installing the first ModulePanel

Please observe the information in chapter 3 - Substructure - before fastening the ModulePanels. The ModulePanels mounted level with the rear side (pipe side) on the substructure.



The ModulePanels are fastened using original FERMACELL screws, 3,9 x 40 mm. For the quantity required and the fastening positions see chap. 4.1, 4.2.

Tip: Use a power screw gun if possible and set the penetration depth of the screw head to 0.1 - 1.0 mm.

4.6 Joint adhesive / Installing the remaining ModulePanels

The FERMACELL grouting adhesive from the cartridge gun is applied to the dust-free edge of the panel as



a flat bulge (width approx. 14 mm). The working temperature of the adhesive should be > +10 °, the room temperature should be > +5 °C. **Tip:** Cut off the cartridge tip as shown in the illustration.





The remaining ModulePanels are thus pressed against the already installed ModulePanels, resulting in a seam with a maximum width of 1,0 mm (visual inspection!). Then screw the ModulePanel in place as specified (see chap. 4.1, 4.2).



Check the abutting seam of the panels:



view of certing underside



4.7 Installation of panels between already installed FERMACELL panels

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

- Glue one side of the panel ③ using FER-MACELL joint adhesive
- Leave a 5-6 mm gap (to the panel ①). This is <u>completely</u> filled with Cosmofen Duo or Würth 2-component adhesive PUR.

4.8 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.) (see chapter 5.1)



4.9 Transitions to other surfaces

The areas at the sides of the ModulePanels are filled out using FERMACELL gypsum fibreboards 18 mm (please observe the FERMACELL guidelines). These panels without pipes 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. Connections to walls or pitched roofs are to be constructed as drywall seams (ca. 7 mm) = with a separating layer = or using angled beading (decoupled connections).

Caution: Pay special attention to the Variomodular pipes when fastening the ModulePanels in the connection areas (deviation from fastening area)!



Connection with separating layer



150 - 160 mm

Connection with angled beading





ModuleStandardCeiling to roof pitch

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



Connection with UD profile

Movement joints:

Movement joints are to be provided every 8 m in ceiling constructions.

Caution: Pay special attention to the Variomodular pipes when fastening the ModulePanels in the area of the movement joints (deviation from fastening area)!





Movement joint with panel strip

Movement joint with additional profile

4.10 Ceiling elements



Ceiling element example

4.11 Insulation with ModuleStandardPanels-Acoustic

With <u>ModuleStandardPanels-Acous-</u> <u>tic</u> the hollow space in the ceiling construction is laid with mineral wool (e.g. Rockwool Sonorock or equivalent). Vapour-retarders cannot be installed. Care must be taken to ensure that the dew point is not reached within the mineral wool.



Example of substructure insulation

4.12 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 pipe16x2 Laser is used as the supply pipe.

Maximum heating/cooling area per heating/cooling circuit: 6.25 m²

Caution: Only use original Variotherm system components:

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

<u>Maintenance</u>

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 the 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
 if the press-fitting jaws are fully closed at (A) and at (B) has a correct press connection been carried out. →
 Visual inspection (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).

5. Further finishing of the ModulePanel surface

5.1 Stopping

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

After installation, the ModulePanel and the FERMACELL panels without pipes are stopped using FERMA-CELL 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 stop- |
| | ping 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.



"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.

6. Leak-tightness test & preheating protocol

| Construction project: |
|----------------------------------|
| Building owner/Occupant: |
| Client: |
| leating installation technician: |
| vrchitect: |
|)ther: |

Leak-tightness test

After installation and before completion work (plastering, painting, wallpapering), the circuits of the Variotherm ModuleStandardCeiling are to 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.

| ightarrow Installation of ModulePanels finished | on: | | |
|--|------------------------------|------------------|-----------------------|
| ightarrow Installation of pipe connections finished | on: | | |
| ightarrow Pressure test started | on: | with test pressu | re bar |
| ightarrow Pressure test finished | on: | with test pressu | re bar |
| ightarrow Start of completion work (plastering, painting | J, wallpapering) on: | | |
| ightarrow System pressure during the completion work | was bar | | |
| ightarrow The system water was treated (e.g. per ÖNOF | ≀M H5195-1) | 🗆 Yes 🗖 No | |
| ightarrow Antifreeze was added to the system water | | 🗌 Yes 🗌 No | |
| ightarrow The system was checked for leak-tightness | on: | and approved | |
| Approval: | | | |
| Building owner/Occupant/Client Constru | uction management/Architect | Heating ins | stallation technician |
| Preheating Protocol | | | |
| Preheating of the Variotherm ModuleStandardCe | iling | | |
| ightarrow Completion work finished on: | | | |
| \rightarrow Preheating started on: | | | |
| ightarrow Supply temperature set to 23 - 30 °C and reta | ained for 1 day | | completed 🗖 |
| ightarrow Increase to a supply temperature of 30 - 40 ° | C and maintained for ½ day | | completed 🗖 |
| ightarrow Set to maximum calculated supply temperatu | ıre plus 5 °C | | completed 🗖 |
| (Caution: The maximum supply temperature | of the ModuleStandardCeilir | ng is: 50 °C) | |
| ightarrow Maintained for ½ day, set falling supply tem | perature to 30 °C, maintaine | ed for 1 day | completed 🗖 |
| ightarrow Heating switched off on: | | | |
| ightarrow Operating state and outdoor temperature on | handover: | | |
| Approval: | | | |
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Variotherm has been developing, producing and selling innovative, ecological and economical heating and cooling systems since 1979.



VARIOTHERM HEIZSYSTEME GMBH

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