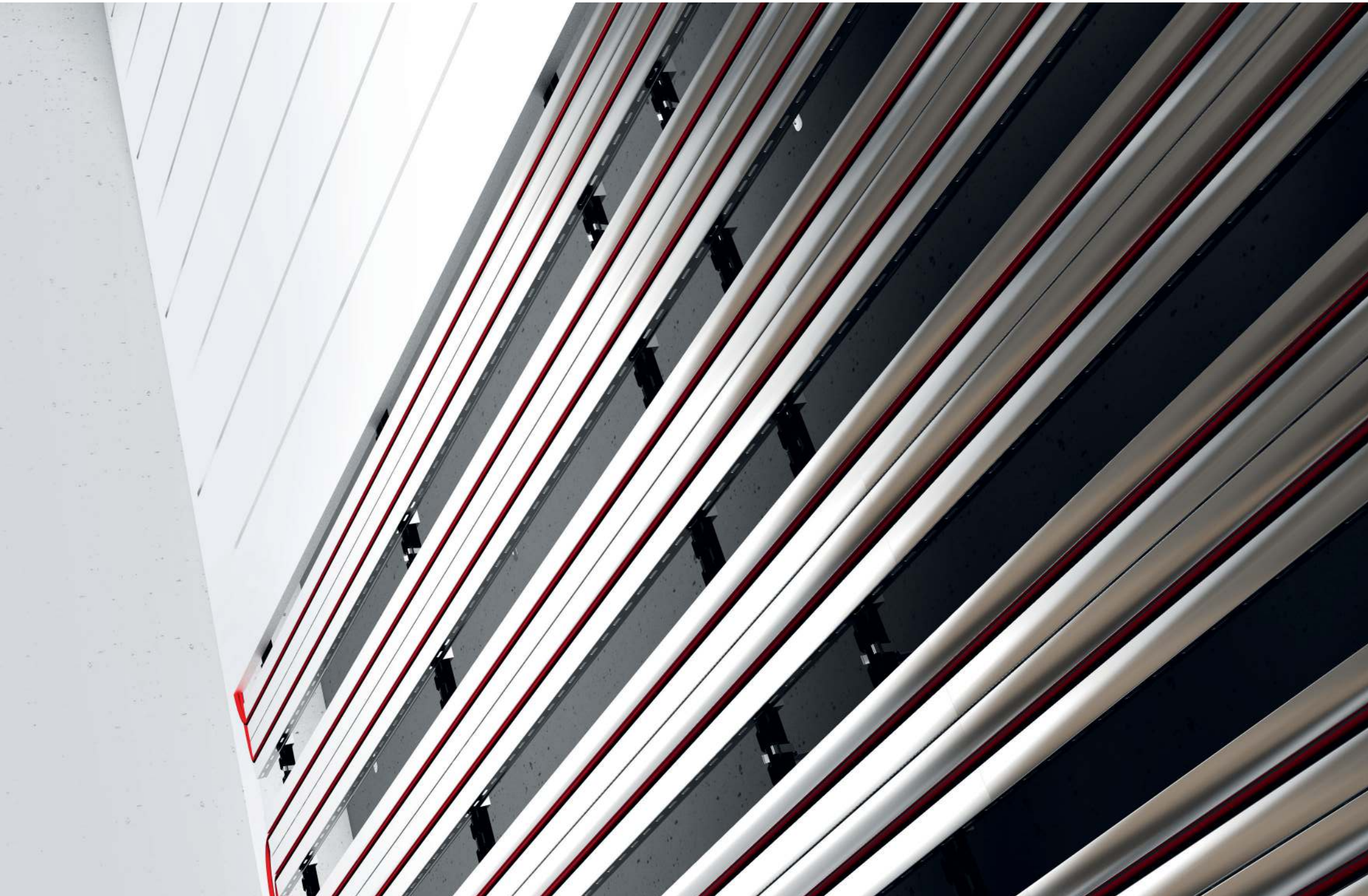
# CLIMALINE Panel Ceiling Linear

## Aluminium panels, smooth or perforated



The climate profiles (heat flux profiles) of the CLIMALINE Panel Ceiling Linear are attached to the panel supporting rail using cross connectors. Pipes are then pushed into the climate profiles. The ceiling is then closed with the panels clamped in.

## Product Advantages

Linear design, variable configuration, easy installation
Clear separation of drylining and HVAC
Pleasant environment and cosiness
Sound-absorbing, diffusion-closed
Ball impact resistant, accessible

## Areas of Application

Sports halls
Hospitals
Office buildings
Entrance halls
Shops

## Technical Data

| | |
|---|---|
| Surface | aluminium panels |
| Operational weight | approx. 10.0 kg/m² |
| Water content | approx. 0.7 l/m² |
| Pipe meander | composite pipe 16 x 2.0 mm |
| Heat flux profiles | 100 mm wide, 27 mm high, 0.7 mm aluminium |
| Aluminium profiles | 300 mm module width, 285 mm profile width, 15 mm joint width, 0.8 mm aluminium, smooth or perforated |

## Technical Properties

### Building material class

Ceiling panel A1 according to EN 13501-1
Plastic meander B2 DIN 4102-4

### Sound absorption

According to DIN EN 20354 (ISO 354)
ASTM C 423

### Durability

Stress class D
according to DIN EN 13964 table 7 and 8
Diffusion resistant according to DIN 4726

### Light reflection

Approx. 84 % (similar to RAL 9016)

### Performance

Heating output according to DIN EN 14037
Cooling output according to DIN EN 14240

### Ball impact resistance

Ball impact resistance according to DIN EN 18032-3
Shock-proof acc. to EN 13964 Annex D

CE EN 13964

The panels are manufactured according to the TAIM quality standard

# System Components

| Item | Designation | Art. no. | Material per m² | | Illustration |
|---|---|---|---|---|---|
| | | | Unit | Quantity* | |
| 1 | Ceiling anchor<br>(metal knock-in anchor) | ***** | pieces | 1.3 |  |
| 2 | Nonius – upper part,<br>available lengths: 200 / 300 / 400 / 500 /<br>600 / 700 / 800 / 900 / 1000 / 1100 mm | ***** | pieces | 1.3 |  |
| 3 | Nonius – lower part,<br>for the panel supporting rail | 15506 | pieces | 1.3 |  |
| 4 | Nonius – safety splint | ***** | pieces | 2.6 |  |
| 5 | Supporting rail KS 50,<br>for panel KS 285,<br>aluminium 0.8 mm | 20277 | m | 0.78 |  |
| 6 | CLIMALINE climate profile Type A<br>100 / 27 / 0.7 mm aluminium,<br>length: 4000 mm | 177974 | m | 6.7 |  |
| 7 | CLIMALINE cross connector<br>for CLIMALINE climate profile,<br>packing unit: 75 pieces | 184765 | pieces | 5.85 |  |
| 8 | CLIMALINE composite pipe 16 x 2 mm, diffusion-closed<br>Quantity: 200 m<br>500 m | 317791<br>317792 | m | 8 |  |
| 9 | Panel KS 285, width: 285 mm<br>Surface: smooth<br>perforated | 209289<br>209500 | m | 3.33 |  |
| 10 | Longitudinal connector<br>for panel KS 285 | 229881 | pieces | 0.5 |  |
| 11 | Head piece<br>for panel KS 285 | 232073 | pieces | 0.5 |  |
| 12 | Safety clip BW<br>to secure the panel KS 285 | 159169 | pieces | 2.6 |  |

Helpful installation tools, see the chapter CLIMALINE Panel Ceiling Linear on page 70.

** for maximum spans (distances)* ***** *please check in your CLIMALINE branch*

# Assembly Instructions

CLIMALINE panel ceilings are manufactured according to the quality standard of TAIM e.V. The general assembly instructions of the TAIM e.V. must be observed. The assembly requirements for ball impact safety are discussed on page 67.

### Construction site conditions

When the building – or a substantial part of the building – is glazed, wind- and waterproof, the installation can begin. Brickwork should be completed prior to installation.

The system components must be kept dry during transportation and storage.

### Construction distances


a1: max. 400 mm a2: max. 1280 mm
b1: max. 150 mm b2: max. 800 mm

### Installation preparation

Before the start of the construction work, the detailed ceiling plans – if possible with site visit – should be prepared:

1. for the on-site measurement of the panels
2. for the material requirements of substructure and accessories

Planned integrations into the ceiling area such as inspection hatches, lamps, spots, ventilation elements etc. must be taken into account during planning of the substructure.

A decision should be made with the construction management to complete all conduits in the ceiling void before starting to install the ceiling.

In order to integrate other trades (lighting, ventilation) in the ceiling area, installation on a cooperative basis should be agreed with the trades in question.

### Preparation of the ceiling areas

The panel lengths must be determined according to the given panel direction of the rooms.

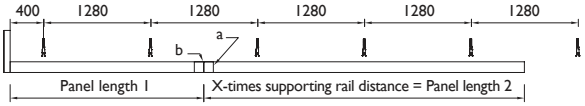
Panel butt joints must be provided for panel lengths over 6 m.

A shifted arrangement of panel joints in place of linear arrangement is generally recommended.

When installing lights and inspection hatches, the greater need for supporting rails and hangers must be considered.

#### *Panel length calculation*

Panel connectors of the CLIMALINE system KS 285 require a panel joint between the supporting rails.




a: Longitudinal connector b: Butt joint

Example: the supporting rails arrangement with acoustic insulation on top at a width of 1250 mm in consideration of the panel connections between the supporting rails.

## Preparation of the substructure

The room dimensions and the rectangularity of the room must be checked at the beginning of the work.

The direction of panel determines the supporting rail course (90° to the direction of the panel) and thus – with irregular rooms – any cuts to the panel end.

The specified ceiling height must be checked. Compliance with the height should be checked for any obstructions by girders, ducts etc., taking into account the height of the panel system.

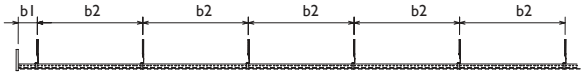
When preparing installation, the manufacturer guidelines for the following must be followed:

- Supporting rail distance (span width of the panels)
- Hanger distance (span of the supporting rails)

The supporting rail and hanger distances must be observed. A rail joint shifted approx. 1000 mm must be taken into consideration.

### *Construction distances*

| | | |
|---|---|---|
| First supporting rail to panel end | (a1) | 400 mm |
| Supporting rail axis max. | (a2) | 1280 mm |
| First hanger for the supporting rail end | (b1) | 150 mm |
| Hangers distance max. | (b2) | 800 mm |




b1: max. 150 mm b2: max. 800 mm

This assembly distances apply for
1. Single- and multiple-span beams
2. Area load of maximum 15 N/m² (acoustic insulation)

### *Preparing the installation of the substructure*

The direction of the panel should be rectangular to the supporting rail direction marked by a chalk line on the raw ceiling. It is also advisable to mark mounting parts on the raw ceiling. This approach prevents supporting rails from having to be unnecessarily cut or retrofitted later.

The supporting rail distance to the wall and the maximum distance between the supporting rails must be complied with the manufacturer's instructions.

If mineral wool panels in standard dimensions are used, the maximum supporting rail distance can be reduced to the size of the mineral wool boards. The anchorage of suspension components into the raw ceiling (concrete, lightweight concrete etc.) is undertaken according to the rules of the relevant ETAG. Only an approved fastener may be used for the respective mounting base according to the assembly guidelines of manufacturer of the fastener in question.

Drill holes or mounts for the hangers can be made according to the system-related manufacturer's instructions for wall and centre distances along the marked supporting rail.

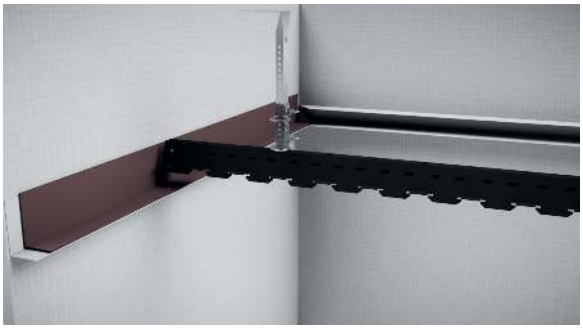
## Angle assembly

Professional edge angle installation is carried out at the start.

## Suspension assembly

When mounting hangers, ensure that these meet vertically on the supporting rails. The impact of pressure and pulling forces on the supporting rails, which lead to tilting of the sides of the supporting rails and thereby affect the visible side of the panel, should be avoided.

Rigid suspensions, consisting of upper Nonius part and lower Nonius part for keyhole mounting on the supporting rail, should be aligned and secured with 2 safety splints at final height level.



## Supporting rail mounting

The supporting rails are attached to the mounted hangers (figure p. 64). It is recommended hanging some setting panels after the installation of the supporting rails to verify the even height levelling to the end profile.

It should be ensured, that the supporting rails run parallel to each other after assembly and form an angle of 90° with the clamped panels.

Supporting rails may never be installed or attached tightly between adjacent building elements. They must be freely movable, so that when hanging the panels all supporting rails can align themselves with each other in the module itself. Supporting rails' longitudinal connections are made according to the manufacturer's specifications or with system-compatible connectors.

Three panel series should be mounted along the entire length of the panel as setting panels. The first supporting rail connection must be set. More connections of the supporting rails are made with progressive panel mounting.

### *Supporting rail connections*

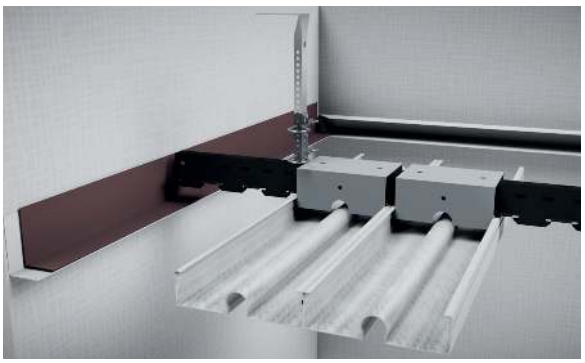
Longitudinal connections of supporting rails are assembled with supporting rail connectors for KS 50 supporting rails in accordance with the manufacturer's specifications. These are clipped onto ends of the supporting rails in a modular design.

## Installation of the base area

This first area should be mounted completely, i.e. the setting panels should be dismantled, the piping of the climate profiles (see climate profile mounting et seq.) should be undertaken and the panels refitted then. This provides a stable base area for the friction-locked assembly of the entire remaining ceiling area.

## Climate profile mounting

The CLIMALINE climate profiles are mounted with cross connectors on the suspended supporting rails. These climate profiles should end approximately 250 mm in front of the limiting building element.



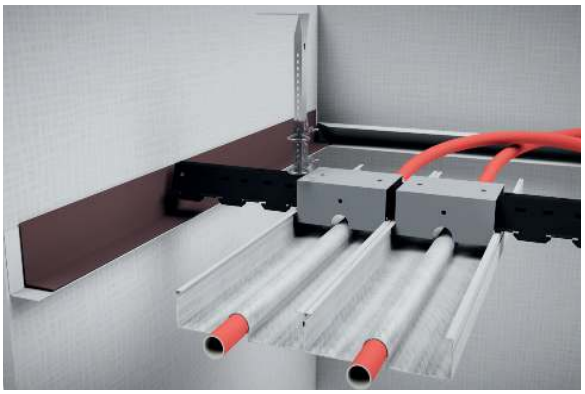
### *Composite pipe fitting*

Then the piping is fitted.

It is initially advisable to attach only every second profile and to provide the free profiles in-between with the next circuit.

Each circuit covers an area of approximately 12 $m^2$ (for exact length of pipe see hydraulic calculation on page 69).

Therefore various control circuits are created, which are subsequently connected to appropriately dimensioned circuit distributors using plug-ins.

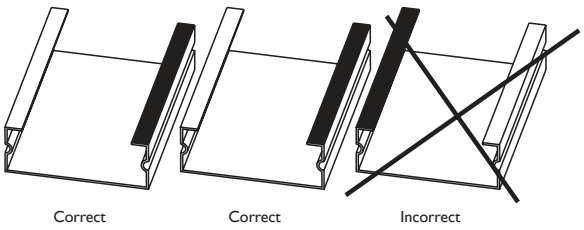


## Panel mounting

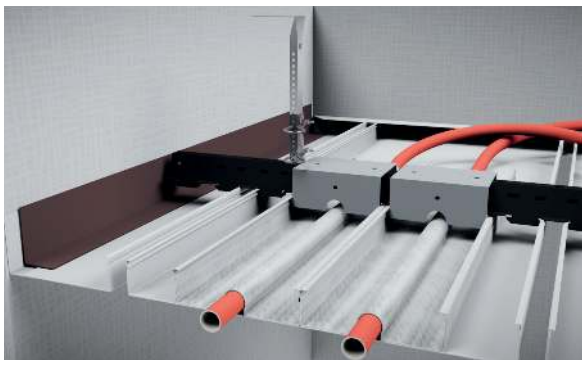
The panels must always point in the same direction with their markers to avoid even minor colour or gloss differences.
Marked panel sides may not be next to each other.

This also applies to KS 285 panels which are cut at the building site. The panels are marked ex works. Thus, the same direction with uniform positioning is ensured.

Marking: black or red line on the upper C bending of the panel




The panels are mounted by clamping into the supporting rails press cuts.



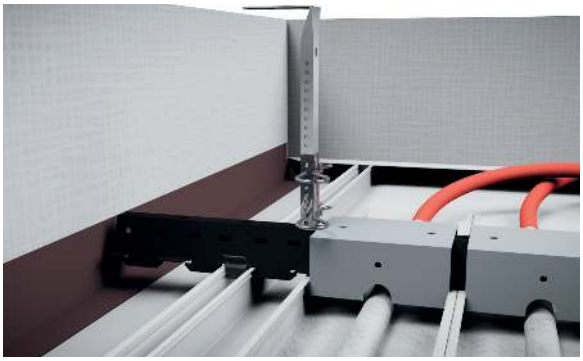
Progressive panel installation has to ensure a flawless ceiling design and an even levelled area – with sliding panels.

With progressive panel mounting the final supporting rails' longitudinal connections need to be assembled.

A precise system module of panel and joint width must always be realised around all parallel supporting rails after clamping the panels in.

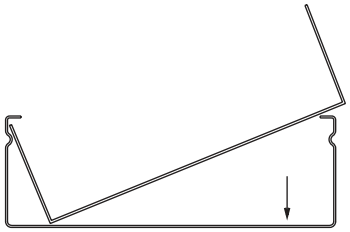
Panels are never tightly fitted between limiting components due to material expansion.

Panel lengths should be cleanly cut with tools which are suitable for the material. Panel length cuttings should be secured with double angle and securing clip.



### Panel longitudinal connections

Panel longitudinal connections are undertaken with panel connectors of the manufacturer and should be set in the measurement or prior to installation.



### Cutting edge curves

If the panel ends are laid onto a wall angle, permissible tolerances are defined for cutting edge curves at the end of the panel after TAIM.

For enhanced requirements of the building planner on the flatness of the panel ends on the edge angle, plan flatness plug-in profiles are available in the system assortment.

The flatness profiles must be inserted at the end of the panel before the panel is mounted.

### Acoustic insulation

The insulation material is laid as part of ongoing panel mounting. The insulation pad is placed between 2 supporting rails on the edges of the panels and climate profiles. The work is carried out in such a way that insulation board joints are not visible in the panel joints.
Additional expense is expected in the area of the

pipe bends, because here the pads must be cut at the building site.

Sound absorption pads are generally permitted up to 15 N/m$^2$ surface weight. With higher surface weight, the construction distances are adapted in accordance with manufacturer's specifications.

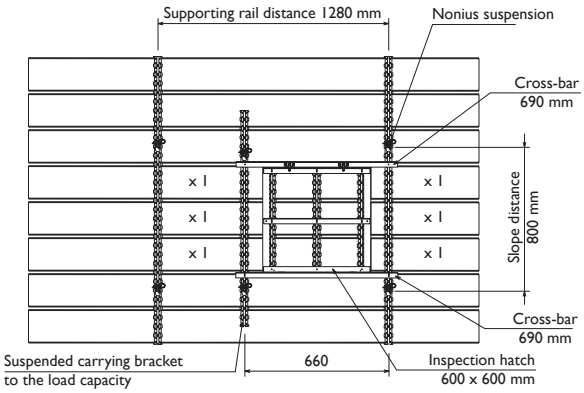
### Installing an inspection hatch

The hinged inspection hatch without panels is supplied with two cross-bars.

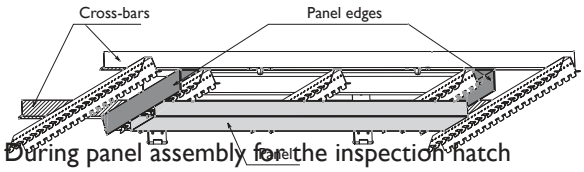
The bars are placed on mounting rails and, depending on the orientation of the module, are screwed with self-locking M5 hexagon socket screws, washers and hexagon nuts.

The screws are not included.

Panels, which run on the inspection hatch, are measured precisely from the wall up to the bottom edge of the inspection hatch.




After installing the inspection hatch, the panels on the flap must be attached precisely onto the supporting rails of the hatch.



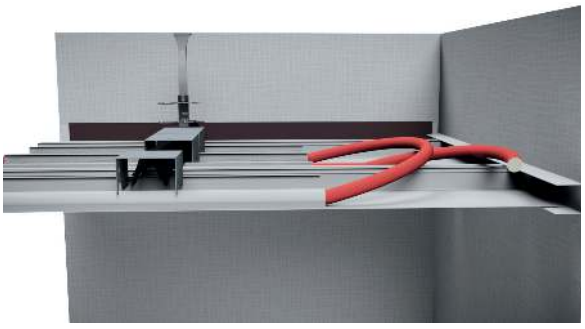

During panel assembly for the inspection hatch

1. the inspection hatch must be opened,
2. the panel on the front must be inserted,
3. the panel must be hooked in the supporting rail.

### Additional installation instructions for required ball impact resistance

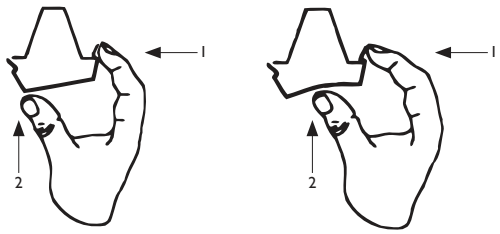
### Head piece for panel end

To prevent deformation of edges and damage to the panels, the panel ends are equipped with a stabilizing U-profile (head piece).



### Installation securing clip

To prevent the individual panels from falling out through ball impact, safety clips must be snapped onto each supporting rail in the joints.




### Non thermally activated ceiling areas

Panels which are not thermally activated should be fitted on the full-lengths with climate profiles.

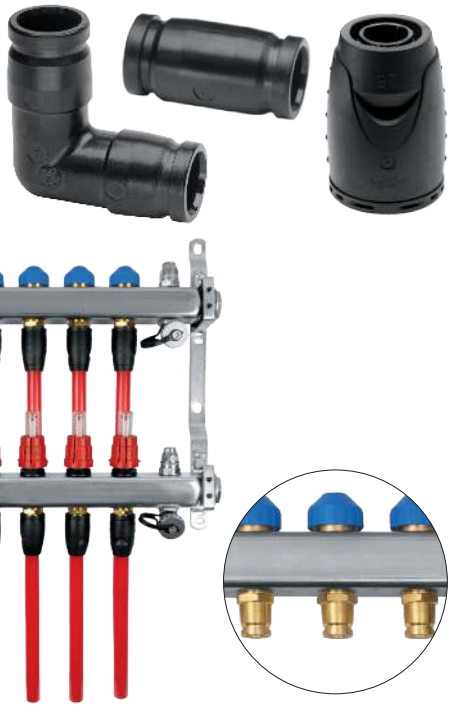
The climate profiles are needed to stabilize the top layer (e.g. inspection hatches, short lengths of panels).

### CLIMALINE VR connector and adapter

If there is a kink in the pipe or if the composite pipe has ended, the pipe can be reconnected at any time easily and safely.

The connecting fitting consists of either a VR longitudinal or an angle connector and two VR adapters. The adapters are just plugged on the connector and the pipes can easily be plugged in then. Immediate after the pipe is plugged into the adapter the connection is absolutely leak and not demountable any longer without destroying the fitting.

The pipe has to be deburred and graduated inside and outside. We offer a tool which does both necessities in one.



### Connection of the control circuit distributor

We stockpile control circuit distributors of 2 – 12 control circuits. The distributors can be easily connected to each other.

The distributors come with handovers at all return and supply circuits. VR adapters have to be plugged onto these fittings and finally the composite pipes are plugged into the VR adapters. Here, to deburr and graduate the pipe with a special tool is an obligation as well.

At the same time, the distributor is the interface to the HVAC competence, where the dryliner passes the ceiling, like a baton, to the plant installer. Each control circuit is equipped with a mass flow indicator, which makes the commissioning of the ceiling much easier for the HVAC installer.

### Safety instructions

Use stable ladders or scaffolding at a sufficient height. The above installation instructions must be observed in full.

## Performance Data with 0.7 mm Aluminium Profile Type A

### Cooling output according to DIN EN 14240 14037

| Panel system KS 285 | |
|---|---|
| Centre distance between profiles | 150 mm |
| Δt | 10 Kelvin |
| Cooling output | 74 Watt |
| Active area ratio | 0.67 |

### Heating output according to DIN EN

| Panel system KS 285 | |
|---|---|
| Centre distance between profiles | 150 mm |
| Δt | 15 Kelvin |
| Heating output | 94 Watt |
| Active area ratio | 0.67 |

# Design with 0.7 mm Aluminium Profile Type A

The following tables show examples of the heating and cooling capacity per $m^2$ for predetermined systems and system temperatures.

**These tables do not obviate the statutory requirement to have a hydraulic calculation prepared by a specialist company according to DIN 18380.**

**Cooling** **System: Aluminium Type A Panels 285**

| System temperature | | | | | | |
|---|---|---|---|---|---|---|
| Supply temperature | 15 °C | 15 °C | 15 °C | 16 °C | 16 °C | 16 °C |
| Return temperature | 17 °C | 18 °C | 19 °C | 18 °C | 19 °C | 20 °C |
| Room temperature | 26 °C | 26 °C | 26 °C | 26 °C | 26 °C | 26 °C |
| Cooling output per $m^2$ | 74.00 W | 70.30 W | 66.60 W | 66.60 W | 62.90 W | 59.20 W |
| Maximum pipe length per circuit | 53 m | 71 m | 85 m | 57 m | 74 m | 95 m |

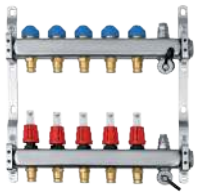
**Heating** **System: Aluminium Type A Panels 285**

| System temperature | | | | | | |
|---|---|---|---|---|---|---|
| Supply temperature | 38 °C | 38 °C | 38 °C | 35 °C | 35 °C | 35 °C |
| Return temperature | 35 °C | 33 °C | 31 °C | 32 °C | 30 °C | 28 °C |
| Room temperature | 20 °C | 20 °C | 20 °C | 20 °C | 20 °C | 20 °C |
| Heating output per $m^2$ | 103.40 W | 97.13 W | 90.87 W | 84.60 W | 78.33 W | 72.06 W |
| Maximum pipe length per circuit | 57 m | 81 m | 107 m | 66 m | 95 m | 122 m |

**VDI directive 6034 must be observed.**

# Hydraulic Components

Our patented plug-ins provide safety for the hydraulic connection.

| Designation | | Art. no. | Material | Dimension | Illustration |
|---|---|---|---|---|---|
| CLIMALINE composite pipe, diffusion-closed | | 317791<br>317792 | Plastic/ aluminium | 16 x 2 mm, length: 200 m<br>16 x 2 mm, length: 500 m |  |
| CLIMALINE VR adapter | | 317807 | Plastic | 16 mm |  |
| CLIMALINE VR longitudinal connector | | 317808 | Plastic | for VR adapter 16 mm |  |
| CLIMALINE VR angle connector | | 317809 | Plastic | for VR adapter 16 mm, radius: 90° |  |
| CLIMALINE circuit distributor | for 2 circuits<br>for 3 circuits<br>for 4 circuits<br>for 5 circuits<br>for 6 circuits<br>for 7 circuits<br>for 8 circuits<br>for 9 circuits<br>for 10 circuits<br>for 11 circuits<br>for 12 circuits | 317793<br>317794<br>317795<br>317796<br>317797<br>317798<br>317799<br>317800<br>317801<br>317802<br>317803 | Stainless steel | for VR adapter 16 mm |  |

# Assembly Tools

| Position | Designation | Art. no. | Illustration |
|---|---|---|---|
| W 1 | Pipe cutting tool | 162784 |  |
| W 2 | Pipe deburrer,<br>consisting of deburring bit and interchangeable handle | 162787 |  |
| W 3 | Pipe bending tool | 162785 |  |
| W 4 | Pipe uncoiler 4-arm,<br>specially designed for the use of composite pipes | 163231 |  |

# CLIMALINE Ceiling Systems Checklist

## 1. System selection

☐ Gypsum ceiling system ☐ Metal ceiling system ☐ Free floating ceiling ☐ Thermo Panel 4T

## 2. System

☐ Suspended assembly
- ☐ Heating → System temperature: supply: _____ return: _____
- ☐ Cooling → System temperature: supply: _____ return: _____

☐ Direct assembly
- ☐ Heating → System temperature: supply: _____ return: _____
- ☐ Cooling → System temperature: supply: _____ return: _____

## 3. Building

☐ Floor plan ☐ PDF format ☐ DWG format

☐ Heating load calculation
- ☐ available
- ☐ required*
- ☐ fixed value: _____ watts/m²

☐ Cooling load calculation
- ☐ available
- ☐ required*
- ☐ fixed value: _____ watts/m²

## 4. Measurement and control technology

☐ Climate control
- ☐ wired → ☐ Comfort ☐ Object
- ☐ wireless → ☐ Comfort ☐ Object

☐ Accessories
- ☐ Zone valve
- ☐ Automatic mass flow limiter

** A list of components with U-values and a floor plan in DWG format are required to calculate heating and cooling loads.*