PLANNING COMPENDIUM

2019

ACOUSTICALLY EFFECTIVE CEILING SYSTEMS FOR COOLING AND HEATING

CLIMALINE

CEILING SOLUTIONS

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CLIMALINE Technical Information

Heating and cooling via the ceiling

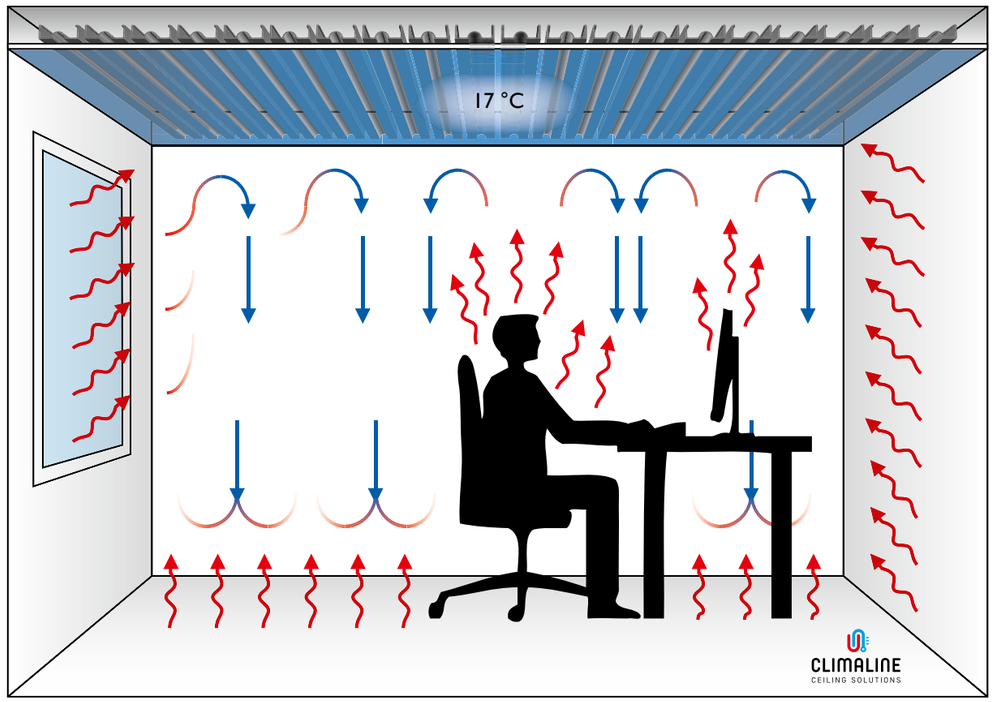
Why a Climate Ceiling?

Room temperature control solely through radiant energy.

Our ancestors found out how it works over 1000 years ago.

This is best expressed by the first law of thermodynamics:

"Energy moves from the hot to the cold medium."



Cooling with the climate ceiling: only 40 % of the effect results from convection, here, too, 60 % of the power is based on radiant energy.

Planked Type A
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Gypsum Tile Ceilings
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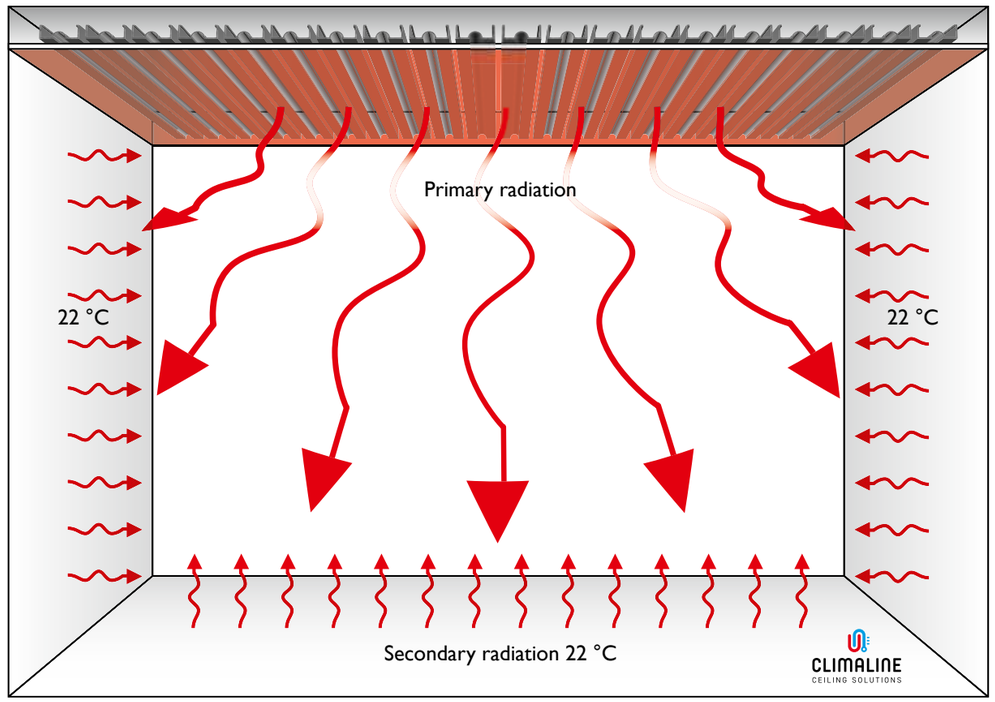
What Does This Physical Principle Mean?

Easy: something that is warm, emits its heat to something that is colder. If our body is warmer than its surroundings, it is cooled. However, if it is colder, it is warmed.

We must now ask ourselves, whether it is at all necessary to heat the human body? You can deny it clearly, because our body continually produces heat which it must emit.

Therefore, we must ensure our environment is tempered in such a way that our body can emit its energy in a controlled manner. This can be achieved best and most comfortably for people by ensuring that the surrounding surfaces reach the proper temperature level.

To meet this requirement, a climate ceiling is offered with low temperature in the heating mode. The cooling mode also has the added comfort of no draughts or noise.



Heating via the climate ceiling: both primary radiation and the secondary radiation resulting from it are emitted into the room.

Technical Construction

In the ceilings – later no longer visible to the eye – pipes through which heating or cooling water flow are laid over a large area.

Sensors, which constantly monitor the dew point and thus prevent the accumulation of condensation, are integrated into the individual ceilings areas.

The room temperature is controlled by special room thermostats that can display both the heating and the cooling modes.

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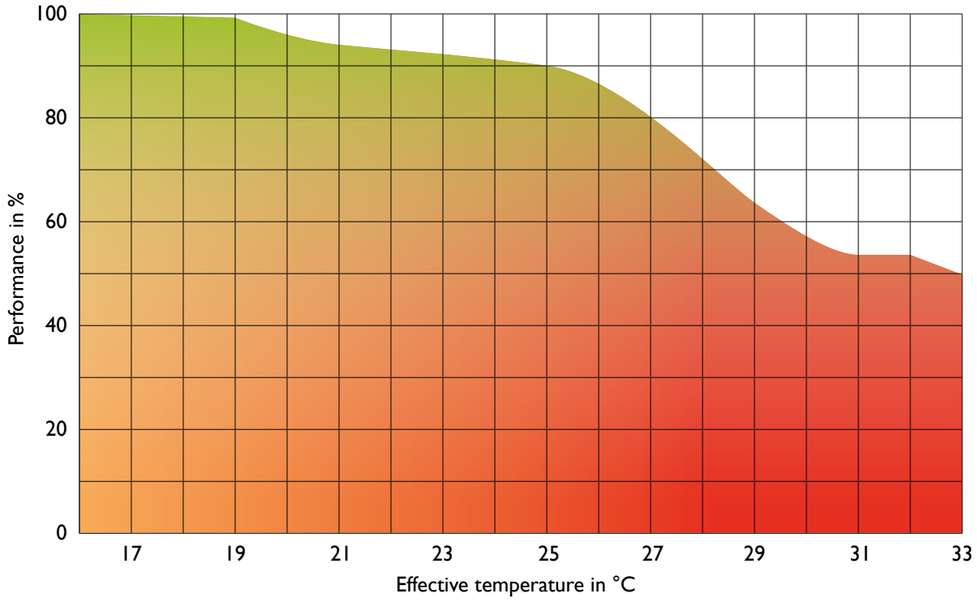
How It Works

Due to the large exchange surfaces, large amounts of energy can be fed and silently transmitted even at low temperature differences between the active room surfaces and the users. A smooth and uniform room temperature is thus achieved.

The energy transfer between the users and the activated climate surfaces takes place predominantly by radiation, which corresponds to the natural conditions for the regulation of the heat balance in all living things.

Human performance in relation to the ambient temperature



It has been demonstrated that people feel good and their productivity increases in rooms that are tempered with a climate ceiling.

During room cooling, the surface temperature of the climate ceiling amounts to approximately 16 – 20 °C depending on the cooling water supply temperature and to approximately 30 to 35 °C in heating mode.

The temperatures in the void above the climate ceiling are (if component insulation is installed) within the range of the ceiling surface temperature.

Advantages

In addition to the many thermal physiological benefits already mentioned, climate ceilings offer many advantages in terms of energy.

As you can see from the technical data, climate ceilings manage with very low supply temperatures.

CLIMALINE GREEN
PRODUCTS FOR SUSTAINABLE CONSTRUCTION

For the user this means:

- If the carrier medium (water) does not have to be heated as much, less energy is consumed.
- Pipes in which colder water flows lose less energy than pipes with warmer water (remember: energy moves from the warm to the cold medium and the higher the temperature difference the greater the heat flow, in other words the loss).
- Huge savings are also achieved since when using surface climate control it is possible to work with greener and more economic room temperatures without compromising the comfort of users.
- As climate ceilings do not have to bridge too large a thermodynamic mass, the function is not subject to any noticeable inertia and reacts very quickly.
- The perceived cosiness of a radiant heating system with low temperature ensures significantly increased comfort in a room.
- Water-powered ceiling cooling not only provides the comfort often cited in this context, but is also the perfect solution in terms of environmental policy.

Plant Technology

Almost every modern system can be used for energy generation (heating, cooling), since today they all only produce very low temperatures.

Compared to conventional systems, which must first produce "air rolls" in the room, climate ceilings respond very quickly to changing requirements for room temperature.

Depending on the system (such as gypsum board or metal), the heating and cooling ceiling can change the temperature within a few minutes.

Only ecologically sound materials that positively affect the indoor climate are used to build climate ceilings.

The gypsum in Climaline plasterboard ceilings takes over the regulation of room humidity. With perforated surfaces, room acoustics are also improved.

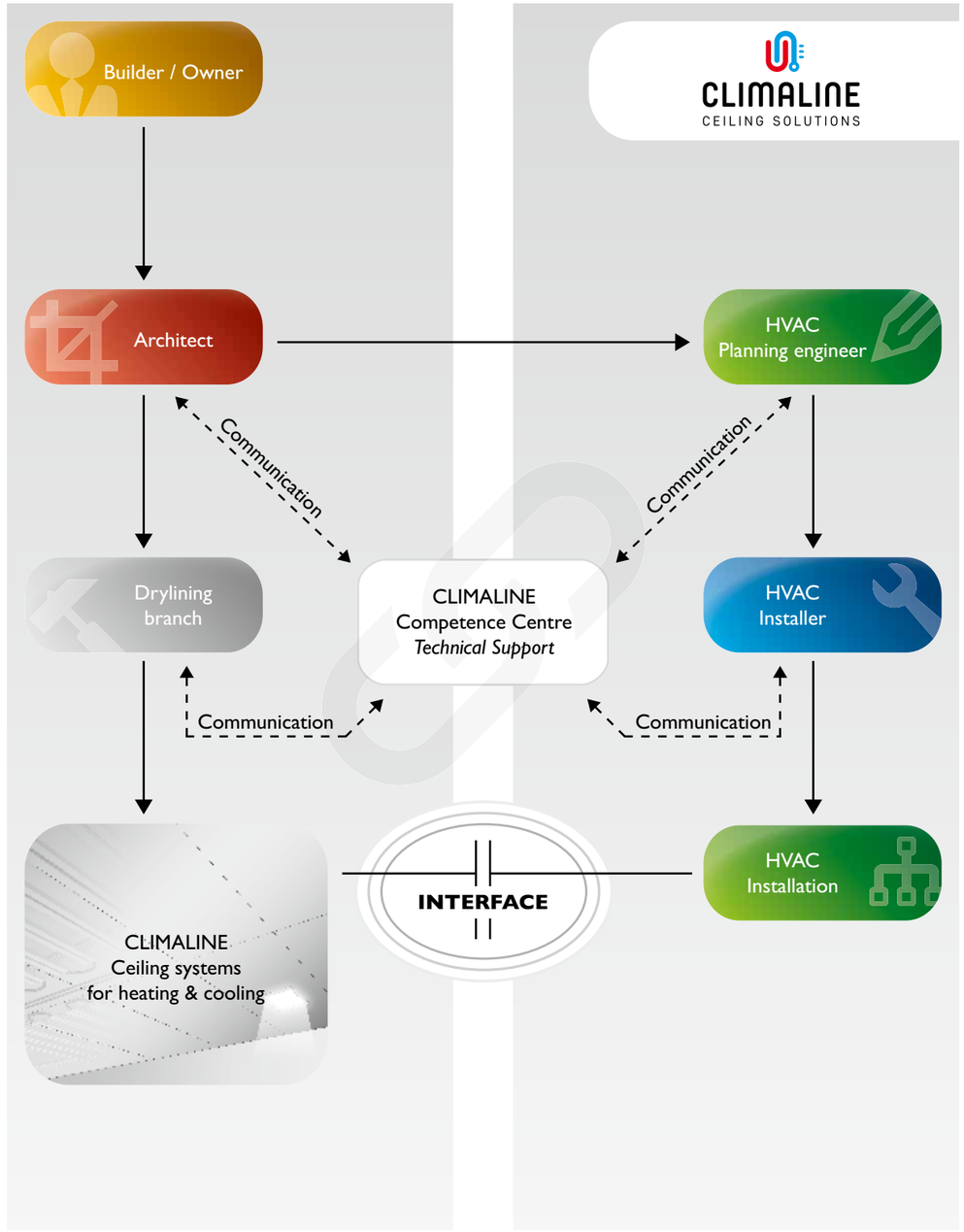
With a climate ceiling you get a thermal physiological room tempering system that leads the way in economic terms.

Especially in combination with modern heat pump technology, a climate ceiling satisfies the requirements arising from the ever more animated discussions concerning sustainability in construction.

Our partner in heat pump technology:

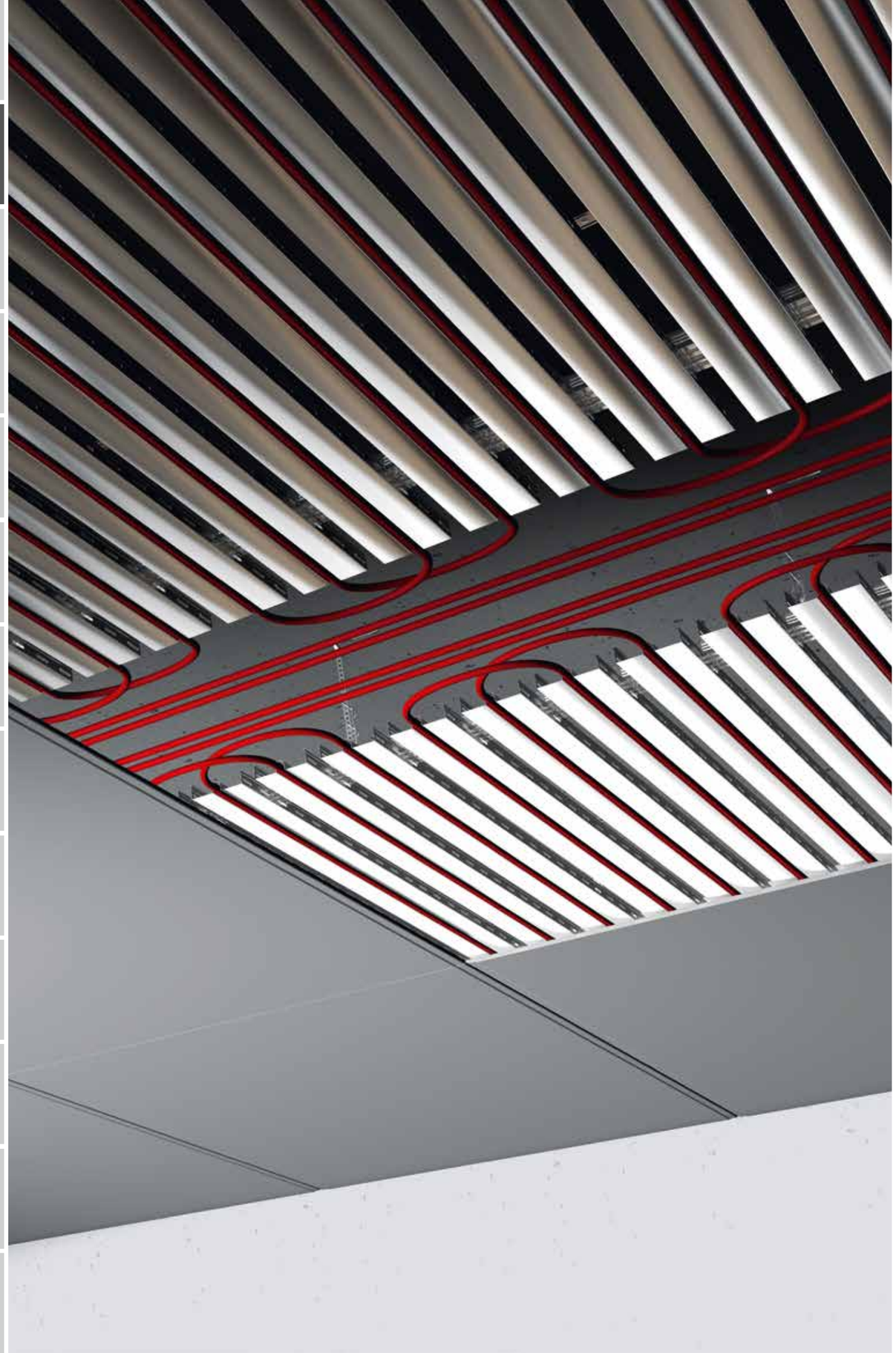
WATERKOTTE

Interface



CLIMALINE Gypsum Planked Type A Suspended Assem-bly

Smooth, perforated, acoustic plaster



The climate profiles (heat flux profiles) of the CLIMALINE gypsum board ceiling are simply fixed with cross connectors under ceiling C-profiles. Pipe installation then follows with the CLIMALINE composite pipe. Plasterboards are then screwed to the ceiling and finally the joints are filled.

Product Advantages

Simple assembly
Clear separation of drylining and HVAC
Joint and directionless
Sound-absorbing
Diffusion-closed

Areas of Application

Office and sales areas
Training/seminar rooms
Hospital rooms
Canteens
Gyms

Technical Data

Planking	gypsum board
Operational weight	approx. 22.5 kg/m²
Water content	approx. 1.0 l/m²
Pipe meander	composite pipe 16 x 2.0 mm
Heat flux profile width	100 mm
Heat flux profile height	27 mm
Centre distance	125 mm
Material	0.7 mm aluminium

Technical Properties

Building material class

Planking A2-s1, d0 according to EN 13501-1
Plastic meander B2 DIN 4102-4

Performance

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

Sound absorption

According to DIN EN ISO 354

Ball impact resistance (i.e. sports halls)

Ball impact resistance according to DIN EN 18032

Durability

Stress class A according to DIN EN 13964
Diffusion resistant according to DIN 4726

CE EN 13964 | According to DIN 18168

System Components

Item	Designation	Art. no.	Material per m²		Illustration
			Unit	Quantity*	
1	Ceiling anchor (metal knock-in anchor)	*****	pieces	1.2	
2	Nonius – upper part, available lengths: 200 / 300 / 400 / 500 / 600 / 700 / 800 / 900 / 1000 / 1100 mm	*****	pieces	1.2	
3	Nonius – lower part for gypsum board 40 kg	*****	pieces	1.2	
4	Nonius – safety splint	*****	pieces	2.4	
5	Ceiling C-profile 60 / 27 / 0.6 mm	*****	m	0.9	
6	CLIMALINE cross connector for CLIMALINE climate profile, packing unit: 75 pieces	184765	pieces	8	
7	CLIMALINE longitudinal connector for CLIMALINE climate profile, packing unit: 100 pieces	164078	pieces	1	
8	CLIMALINE climate profile Type A 100 / 27 / 0.7 mm aluminium, length: 4000 mm	177974	m	8	
9	CLIMALINE composite pipe 16 x 2 mm, diffusion-closed — Quantity: 200 m / 500 m	317791 / 317792	m	9.5	
10	Inspection hatch for CLIMALINE ceiling with prefabricated gypsum plasterboard inlay	s. page 22			
11	Drywall screw according to manufacturer's information	*****	pieces	24	
12	Assembly aid for CLIMALINE climate profile Type A — Installation distance: 125 mm / 150 mm / 175 mm / 200 mm / 250 mm	293716 / 293717 / 293718 / 316993 / 293716			

Helpful installation tools, see the chapter CLIMALINE Gypsum Planked Type D on page 30.

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

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Assembly Instructions

Assembly of the CLIMALINE gypsum ceiling does not differ substantially from the assembly of a standard plasterboard ceiling. The materials comply with the production standards of drylining profile technology.

Substructure

Ceiling C-profiles are suspended with 40 kg Nonius hangers at a maximum distance of 1000 mm. The maximum hanger distance is 800 mm. We recommend to choose a suspension height of not less than 120 mm. As the assembly is based on the DIN standard for light-weight suspended ceilings (DIN 18168), the manufacturing guidelines of the leading gypsum board manufacturers apply.

Climate profile

The CLIMALINE climate profile is mounted at a centre distance of 125 mm and attached to the C-profile with special cross connectors. The use of assembly aids offered in all common centre distances guarantees that the climate profiles are parallel.

To reinforce the structure in itself, it makes sense to fix a screw onto the C-profile around every third cross connector.

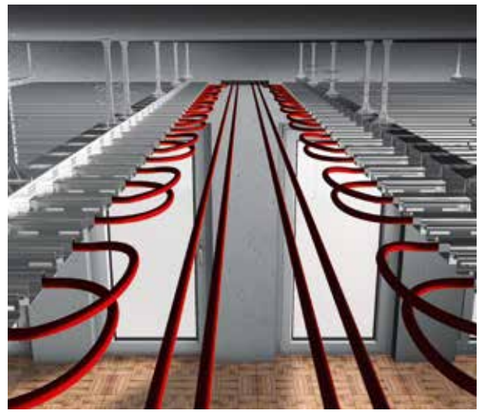
The head sides of the climate profiles end approximately 250 mm in front of the adjacent wall. Another C-profile running parallel to the wall is mounted between the adjacent wall and the ends of the climate profiles once the piping has been laid.

Pipe installation

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

Approximately 10 m² (for exact length of pipe see hydraulic calculation page 21) of pipe are installed for each circuit.

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



Planking

The planking is made with commercially available gypsum boards, plasterboards with optimized heat conductivity or expanded glass granulate boards.

Each profile is screwed in alternation on both sides of the pipe at a distance of 400 mm. This means that the total number of screws needed is no more than in a conventional gypsum ceiling.

It is important not to strike the pipe when screwing the profile. However, if the pipe is struck, the damaged spot can easily be repaired with CLIMALINE VR connectors
(see below).

Please ensure that special screws are used in modified graphite boards in accordance with the manufacturer's instructions. Expansion joints are installed according to the information provided by the manufacturer of the plasterboards used.

CLIMALINE VR connector and adapter

If the fitter has screwed into the pipe, 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.

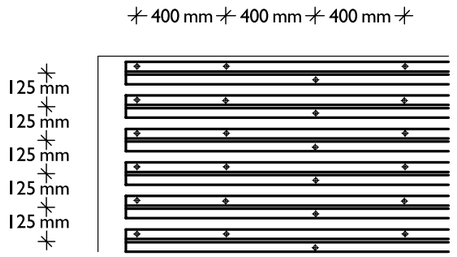
The connecting fitting consists of either a VR longitudinal or an angle connector and two VR adapters. The adapters are just plugged on the connector and the pipes can easily be plugged in then. Immediate after the pipe is plugged into the adapter the connection is absolutely leak and not demountable 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.

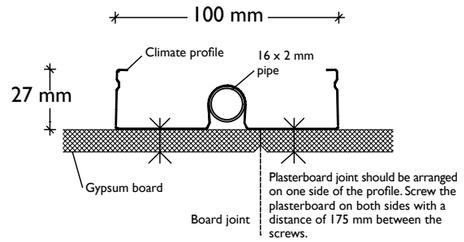
Connection of the control circuit distributor

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



Screwing scheme (centre distance 125 mm)



Screw connection plasterboard on profile

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.

Planking with perforated gypsum board

Commercially available plasterboards as well as heat conduction optimized plasterboards are available for the system in all common hole patterns (regularly perforated and scattered holes).

The guidelines of leading manufacturers in the gypsum board industry again apply to assembly.

Please ensure climate profiles are arranged in such a way that the board joint can be screwed on one side of the climate profile through different formats, depending on the hole pattern (see diagram no. 2 on page 18).

Acoustic plaster

Smooth surfaces are increasingly favoured in the design. The acoustic efficiency of such surfaces is often not aligned with the usage requirements. For this reason, the CLIMALINE gypsum ceiling is also tested with a spray-on acoustic plaster surface. Both the thermal and acoustic values decrease only slightly with the approximately 3 mm thick layer of plaster.

A perforated gypsum board, whose rear side is fitted with a thin plastic sheet and the front with a plaster base fleece, serves as a baseboard. The plaster manufacturer processing guidelines apply to application of the plaster.

Safety instructions

Use stable ladders or scaffolding at a sufficient height.

Performance Data with 0.7 mm Aluminium Profile Type A

Cooling output according to DIN EN 14240

Graphite-modified gypsum board	
Planking thickness	10 mm
Centre distance between profiles	125 mm
Δt	10 Kelvin
Cooling output*	69 Watt
Active area ratio	1.0

Gypsum board 12.5 mm	
Planking thickness	12.5 mm
Centre distance between profiles	125 mm
Δt	10 Kelvin
Cooling output*	56 Watt
Active area ratio	1.0

Gypsum board with slightly increased heat flow	
Planking thickness	10 mm
Centre distance between profiles	125 mm
Δt	10 Kelvin
Cooling output*	59 Watt
Active area ratio	1.0

Lahnau Micropore G FWA cool	
Planking thickness	18 mm
Centre distance between profiles	125 mm
Δt	10 Kelvin
Cooling output**	65 Watt
Active area ratio	1.0

Heating output according to DIN EN 14037

Graphite-modified gypsum board	
Planking thickness	10 mm
Centre distance between profiles	125 mm
Δt	15 Kelvin
Heating output**	85 Watt
Active area ratio	1.0

Gypsum board 12.5 mm	
Planking thickness	12.5 mm
Centre distance between profiles	125 mm
Δt	15 Kelvin
Heating output**	73 Watt
Active area ratio	1.0

Gypsum board with slightly increased heat flow	
Planking thickness	10 mm
Centre distance between profiles	125 mm
Δt	15 Kelvin
Heating output**	75 Watt
Active area ratio	1.0

Lahnau Micropore G FWA cool	
Planking thickness	18 mm
Centre distance between profiles	125 mm
Δt	15 Kelvin
Heating output**	82 Watt
Active area ratio	1.0

** These values are proved by certificates issued by HLK Stuttgart.*

*** These values arise from simulations on the basis of test certificates issued by HLK Stuttgart.*

Design with 0.7 mm Aluminium Profile Type A

The following tables show examples of the heating and cooling capacity per m² 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 GKG 10 mm with graphite-modified gypsum board**

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 m²	69.00 W	65.55 W	62.10 W	62.10 W	58.65 W	55.20 W
Maximum pipe length per circuit	57 m	76 m	94 m	62 m	82 m	100 m

Heating **System: Aluminium Type A GKG 10 mm with graphite-modified gypsum board**

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 m²	94.60 W	88.86 W	83.13 W	77.40 W	71.66 W	65.93 W
Maximum pipe length per circuit	61 m	85 m	107 m	68 m	100 m	131 m

VDI directive 6034 must be observed.

The active area of the CLIMALINE gypsum ceiling corresponds to 100 % of the installed surface.

Please compare this occupancy rate with the other climate ceiling systems.

Hydraulic Components*

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

Designation		Art. no.	Material	Dimension	Illustration
CLIMALINE composite pipe, diffusion-closed		317791 317792	Plastic/ aluminium	16 x 2 mm, length: 200 m 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 distributer	for 2 circuits for 3 circuits for 4 circuits for 5 circuits for 6 circuits for 7 circuits for 8 circuits for 9 circuits for 10 circuits for 11 circuits for 12 circuits	317793 317794 317795 317796 317797 317798 317799 317800 317801 317802 317803	Stainless steel	for VR adapter 16 mm	

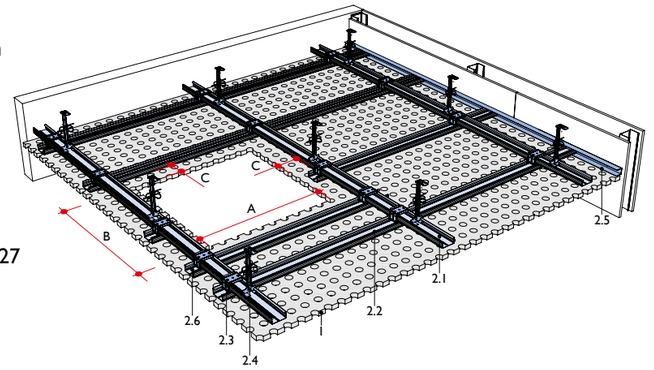
Inspection Hatches for CLIMALINE

Inspection hatches tailored to CLIMALINE ceiling systems with different gypsum climate board inserts in all available hole patterns and plain.

Designation	Art. no.	Insert	Nominal size	Illustration
Inspection hatch for CLIMALINE with Knauf insert	227600	Thermoboard, 10 mm	300 x 300 mm 400 x 400 mm 500 x 500 mm 600 x 600 mm 600 x 400 mm *Additional sizes available on request.*	
	227601	Thermoboard Plus, 10 mm		
Inspection hatch for CLIMALINE with Rigips insert	227602	Climafit, 10 mm		
	227603	Climatop, 10 mm		
Inspection hatch for CLIMALINE with gypsum board insert	227604	Gypsum board according to DIN 18180, 12.5 mm		

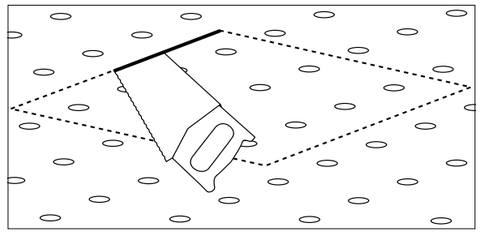
** Helpful installation tools, see the chapter CLIMALINE Gypsum Planked Type D on page 30.*

Mounting the inspection hatch

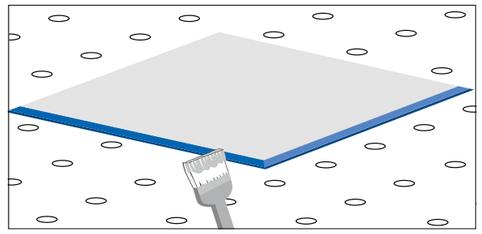


1 Perforated gypsum board
2.1 Basic C-profile 60/27
2.2 Support C-profile 60/27
2.3 Cross connector
2.4 Nonius hanger
2.6 Replacement ceiling C-profile 60/27

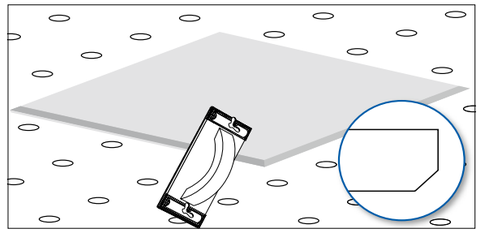
A/B Cut-out dimension (see page 25)
C 45 – 100 mm



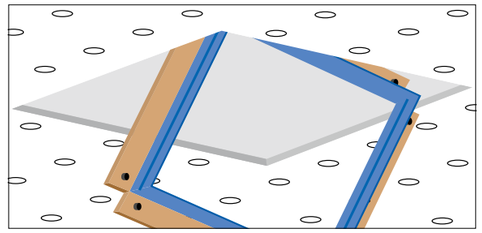
1. Mark and saw out with hand saw in accordance with section drawing



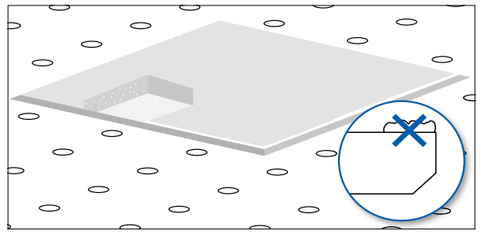
4. Prime cut edges



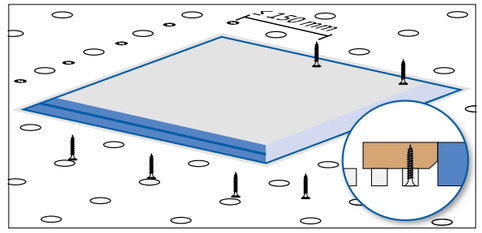
2. Break board edges



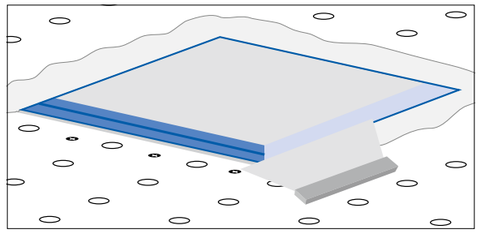
5. Detach inspection hatch from the frame, insert frame and align with bolt



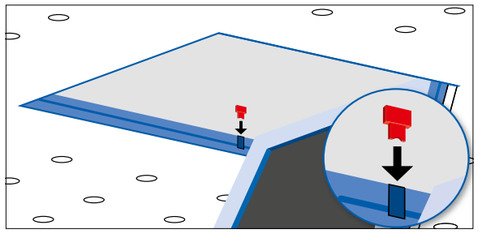
3. Clean top of plaster dust



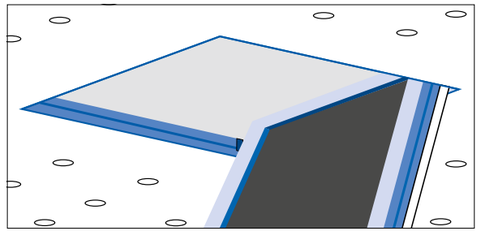
6. Screw the frame; use the screws recommended by gypsum board manufacturer



7. Grout frame

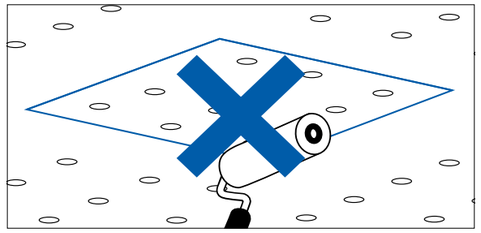


9. Important: mount the fall safety device and close the hatch

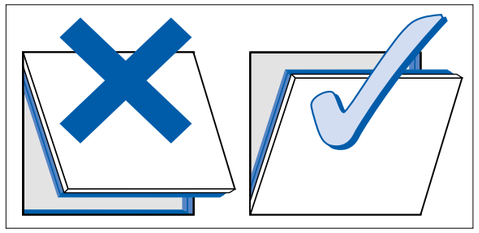


8. Hook in hatch and push back

Special notes



Only paint the inspection hatch in the dismantled state



Install the inspection hatch when vertical so that the pressure opening is on top (not as a door!)

Since we are always striving to offer the best possible solutions, we reserve the right to make changes due to application or manufacturing improvements. Any pictures of work to be carried out that are included are not execution instructions, unless they are explicitly marked as such. Please note that the information cannot replace necessary structural planning. We require that the adjacent trades perform their work in a professional and proper manner.

Technical data

Nominal dimensions of the cut-out openings, inspection hatch openings and minimum suspension heights

	300 x 300 mm			400 x 400 mm		
Perforated gypsum board	Required cut-out size (A+B)	Inspection hatch opening size	Minimum suspension height	Required cut-out size (A+B)	Inspection hatch opening size	Minimum suspension height
6/18	322 mm	305 mm	160 mm	412 mm	395 mm	150 mm
8/18	320 mm	303 mm		410 mm	393 mm	
10/23	334 mm	317 mm		426 mm	409 mm	
12-25	335 mm	318 mm		410 mm	393 mm	
15/30	337 mm	320 mm		427 mm	410 mm	
8-12/50	312 mm	293 mm		412 mm	393 mm	
12-20/66	330 mm	315 mm		396 mm	381 mm	
8-15-20	356 mm	343 mm		406 mm	393 mm	
8-15-20 super	315 mm	300 mm		415 mm	400 mm	
12-20-35	315 mm	300 mm		415 mm	400 mm	
8/18 Q	320 mm	303 mm		410 mm	393 mm	
12/25 Q	335 mm	318 mm		410 mm	393 mm	

	500 x 500 mm			600 x 600 mm		
Perforated gypsum board	Required cut-out size (A+B)	Inspection hatch opening size	Minimum suspension height	Required cut-out size (A+B)	Inspection hatch opening size	Minimum suspension height
6/18	520 mm	503 mm	140 mm	610 mm	593 mm	120 mm
8/18	518 mm	501 mm		625 mm	609 mm	
10/23	518 mm	501 mm		610 mm	593 mm	
12-25	510 mm	493 mm		610 mm	593 mm	
15/30	517 mm	500 mm		637 mm	620 mm	
8-12/50	512 mm	493 mm		612 mm	593 mm	
12-20/66	528 mm	513 mm		594 mm	579 mm	
8-15-20	506 mm	493 mm		606 mm	593 mm	
8-15-20 super	515 mm	500 mm		615 mm	600 mm	
12-20-35	515 mm	500 mm		615 mm	600 mm	
8/18 Q	518 mm	501 mm		625 mm	609 mm	
12/25 Q	510 mm	493 mm		610 mm	593 mm	

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

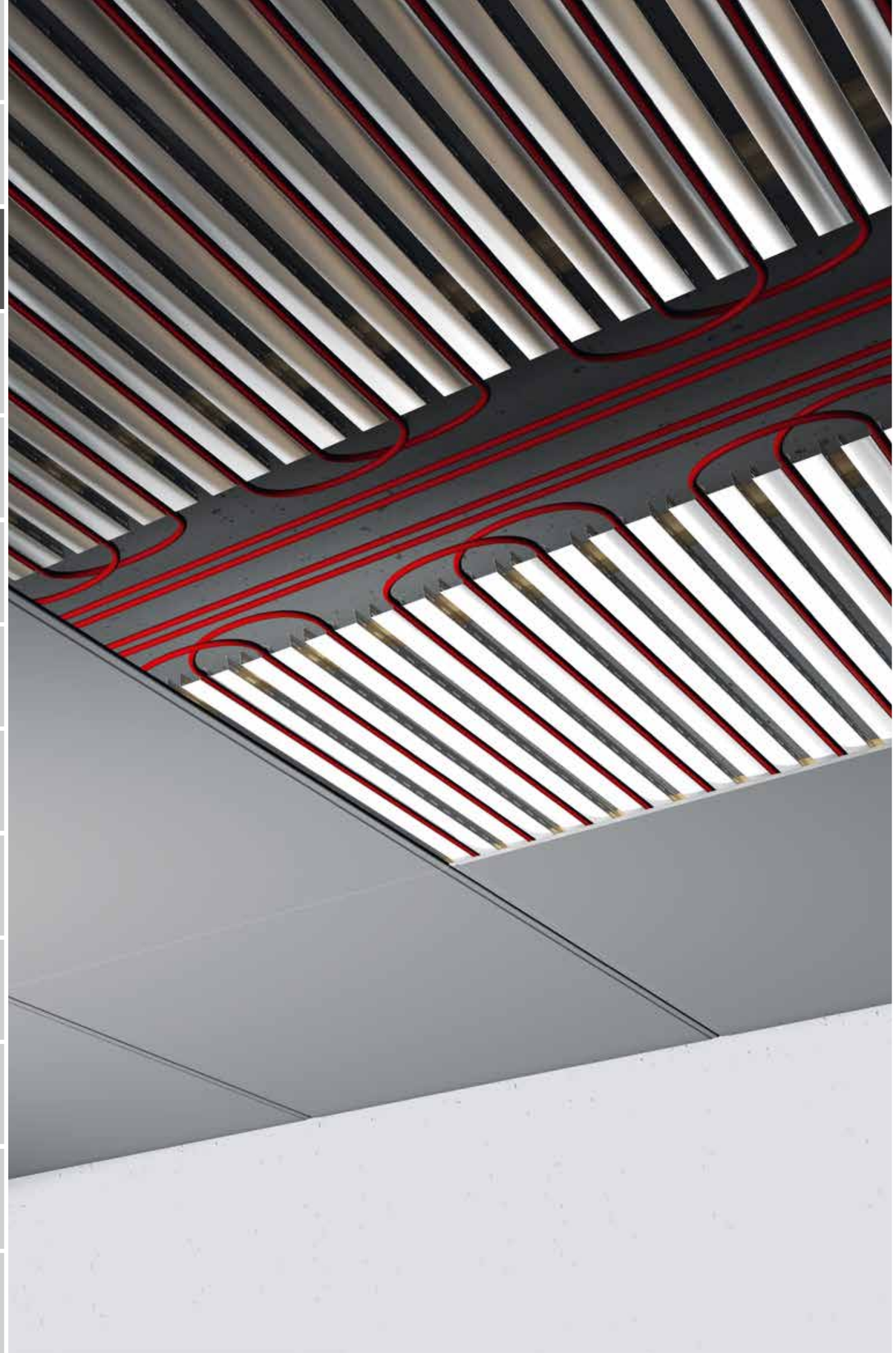
☐ Climate control
- ☐ wired → ☐ Comfort ☐ Object
- ☐ wireless → ☐ Comfort ☐ Object

☐ 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.*

CLIMALINE Gypsum Planked Type D Direct Assembly

Smooth, perforated, acoustic plaster



The climate profiles (heat flux profiles) of the CLIMALINE gypsum board ceiling are simply screwed onto a levelling batten that was previously mounted directly onto the solid part. The height of the groove in the climate profile leaves room for screw head and pipe. Then comes the piping with the CLIMALINE composite pipe. The ceiling is then planked and ultimately filled.

Product Advantages

Easy assembly
Clear separation of drylining and HVAC
Joint and directionless
Low installation height
Diffusion-closed

Areas of Application

Office and sales areas
Training/seminar rooms
Attics
Residential buildings
Sports halls

Technical Data

Planking	gypsum board
Operational weight	approx. 20.0 kg/m²
Water content	approx. 1.0 l/m²
Pipe meander	composite pipe 16 x 2.0 mm
Heat flux profile width	100 mm
Heat flux profile height	27 mm
Centre distance	125 mm
Material	0.7 mm aluminium

Technical Properties

Building material class

Planking A2-s1, d0 according to EN 13501-1
Plastic meander B2 DIN 4102-4

Performance

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

Sound absorption

According to DIN EN ISO 354

Ball impact resistance

Ball impact resistance according to DIN EN 18032

Durability

Stress class A according to DIN EN 13964
Diffusion resistant according to DIN 4726

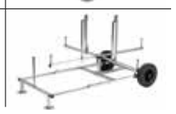
CE
EN 13964

According to DIN 18168

System Components

Item	Designation	Art. no.	Material per m²		Illustration
			Unit	Quantity*	
5	Wooden batten	*****	m	0.9	
8	CLIMALINE climate profile Type D 100 / 27 / 0.7 mm aluminium, length: 4000 mm	185053	m	8	
9	CLIMALINE composite pipe 16 x 2 mm, diffusion-closed Quantity: 200 m / 500 m	317791 / 317792	m	9.5	
11	Drywall screw according to manufacturer's information	*****	pieces	24	

Assembly Tools

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

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

Assembly Instructions

Assembly of the CLIMALINE gypsum ceiling does not differ substantially from the assembly of a standard plasterboard ceiling. The materials comply with the production standards of drylining profile technology.

Ceiling level

Direct assembly is possible in the attic, under a wood-beamed ceiling or under a solid ceiling.

Ideally, the construction is levelled using planed battens (minimum of 22 mm).

Climate profile

The CLIMALINE heat flux profile is screwed into the previously installed levelling battens at a centre distance of at least 125 mm.

Please screw through the groove in the batten.

The use of assembly aids offered in all common centre distances guarantees that the climate profiles are parallel.

The head sides of the climate profiles end approximately 250 mm in front of the adjacent wall.

A climate profile (without piping) running parallel to the wall is mounted directly between the adjacent wall and the ends of the climate profiles.

Pipe installation

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

Approximately 10 m² (for exact length of pipe see hydraulic calculation page 35) of pipe are installed for each circuit.

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

Planking

The planking is made with commercially available gypsum boards, plasterboards with optimized heat conductivity or expanded glass granulate boards.

Each profile is screwed in alternation on both sides of the pipe at a distance of 400 mm. This means that the total number of screws needed is no more than in a conventional gypsum ceiling.

It is important not to strike the pipe when screwing the profile. However, if the pipe is struck, the damaged spot can easily be repaired with CLIMALINE VR connectors
(see below).

Please ensure that special screws are used in modified graphite boards in accordance with the manufacturer's instructions. Expansion joints are installed according to the information provided by the manufacturer of the plasterboards used.

CLIMALINE VR connector and adapter

If the fitter has screwed into the pipe, 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.

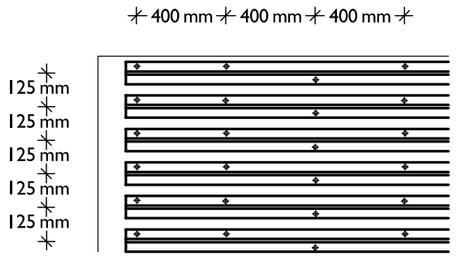
The connecting fitting consists of either a VR longitudinal or an angle connector and two VR adapters. The adapters are just plugged on the connector and the pipes can easily be plugged in then. Immediate after the pipe is plugged into the adapter the connection is absolutely leak and not demountable 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.

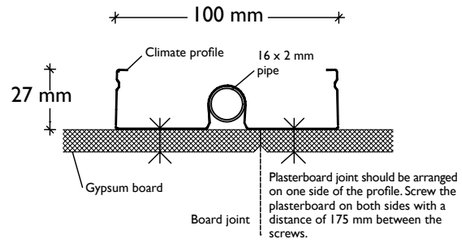
Connection of the control circuit distributor

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



Screwing scheme (centre distance 125 mm)



Screw connection plasterboard on profile

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.

Planking with perforated gypsum board

Commercially available plasterboards as well as heat conduction optimized plasterboards are available for the system in all common hole patterns (regularly perforated and scattered holes).

The guidelines of leading manufacturers in the gypsum board industry again apply to assembly.

Please ensure climate profiles are arranged in such a way that the board joint can be screwed on one side of the climate profile through different formats, depending on the hole pattern (see diagram no. 2 on page 32).

Acoustic plaster

Smooth surfaces are increasingly favoured in the design. The acoustic efficiency of such surfaces is often not aligned with the usage requirements. For this reason, the CLIMALINE gypsum ceiling is also tested with a spray-on acoustic plaster surface. Both the thermal and acoustic values decrease only slightly with the approximately 3 mm thick layer of plaster.

A perforated gypsum board, whose rear side is fitted with a thin plastic sheet and the front with a plaster base fleece, serves as a baseboard. The plaster manufacturer processing guidelines apply to application of the plaster.

Safety instructions

Use stable ladders or scaffolding at a sufficient height.

Performance Data with 0.7 mm Aluminium Profile Type D

Cooling output according to DIN EN 14240

Graphite-modified gypsum board	
Planking thickness	10 mm
Centre distance between profiles	125 mm
Δt	10 Kelvin
Cooling output*	55 Watt
Active area ratio	1.0

Gypsum board 12.5 mm	
Planking thickness	12.5 mm
Centre distance between profiles	125 mm
Δt	10 Kelvin
Cooling output**	49 Watt
Active area ratio	1.0

Gypsum board with slightly increased heat flow	
Planking thickness	10 mm
Centre distance between profiles	125 mm
Δt	10 Kelvin
Cooling output**	50 Watt
Active area ratio	1.0

Heating output according to DIN EN 14037

Graphite-modified gypsum board	
Planking thickness	10 mm
Centre distance between profiles	125 mm
Δt	15 Kelvin
Heating output**	71 Watt
Active area ratio	1.0

Gypsum board 12.5 mm	
Planking thickness	12.5 mm
Centre distance between profiles	125 mm
Δt	15 Kelvin
Heating output**	63 Watt
Active area ratio	1.0

Gypsum board with slightly increased heat flow	
Planking thickness	10 mm
Centre distance between profiles	125 mm
Δt	15 Kelvin
Heating output**	65 Watt
Active area ratio	1.0

** These values are proved by certificates issued by HLK Stuttgart.*

*** These values arise from simulations on the basis of test certificates issued by HLK Stuttgart.*

Design with 0.7 mm Aluminium Profile Type D

The following tables show examples of the heating and cooling capacity per m² 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 D GKG 10 mm with graphite-modified gypsum board**

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 m²	55.00 W	52.30 W	49.50 W	49.50 W	46.80 W	44.00 W
Maximum pipe length per circuit	77 m	98 m	118 m	80 m	105 m	127 m

Heating **System: Aluminium Type D GKG 10 mm with graphite-modified gypsum board**

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 m²	78.50 W	73.40 W	68.60 W	63.90 W	59.20 W	54.50 W
Maximum pipe length per circuit	81 m	111 m	139 m	91 m	124 m	158 m

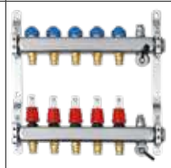
VDI directive 6034 must be observed.

The active area of the CLIMALINE gypsum ceiling corresponds to 100 % of the installed surface.

Please compare this occupancy rate with the other climate ceiling systems.

Hydraulic Components*

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

Designation		Art. no.	Material	Dimension	Illustration
CLIMALINE composite pipe, diffusion-closed		317791 317792	Plastic/ aluminium	16 x 2 mm, length: 200 m 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 for 3 circuits for 4 circuits for 5 circuits for 6 circuits for 7 circuits for 8 circuits for 9 circuits for 10 circuits for 11 circuits for 12 circuits	317793 317794 317795 317796 317797 317798 317799 317800 317801 317802 317803	Stainless steel	for VR adapter 16 mm	

** Helpful installation tools, see the chapter CLIMALINE Gypsum Planked Type D on page 30.*

Notes

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

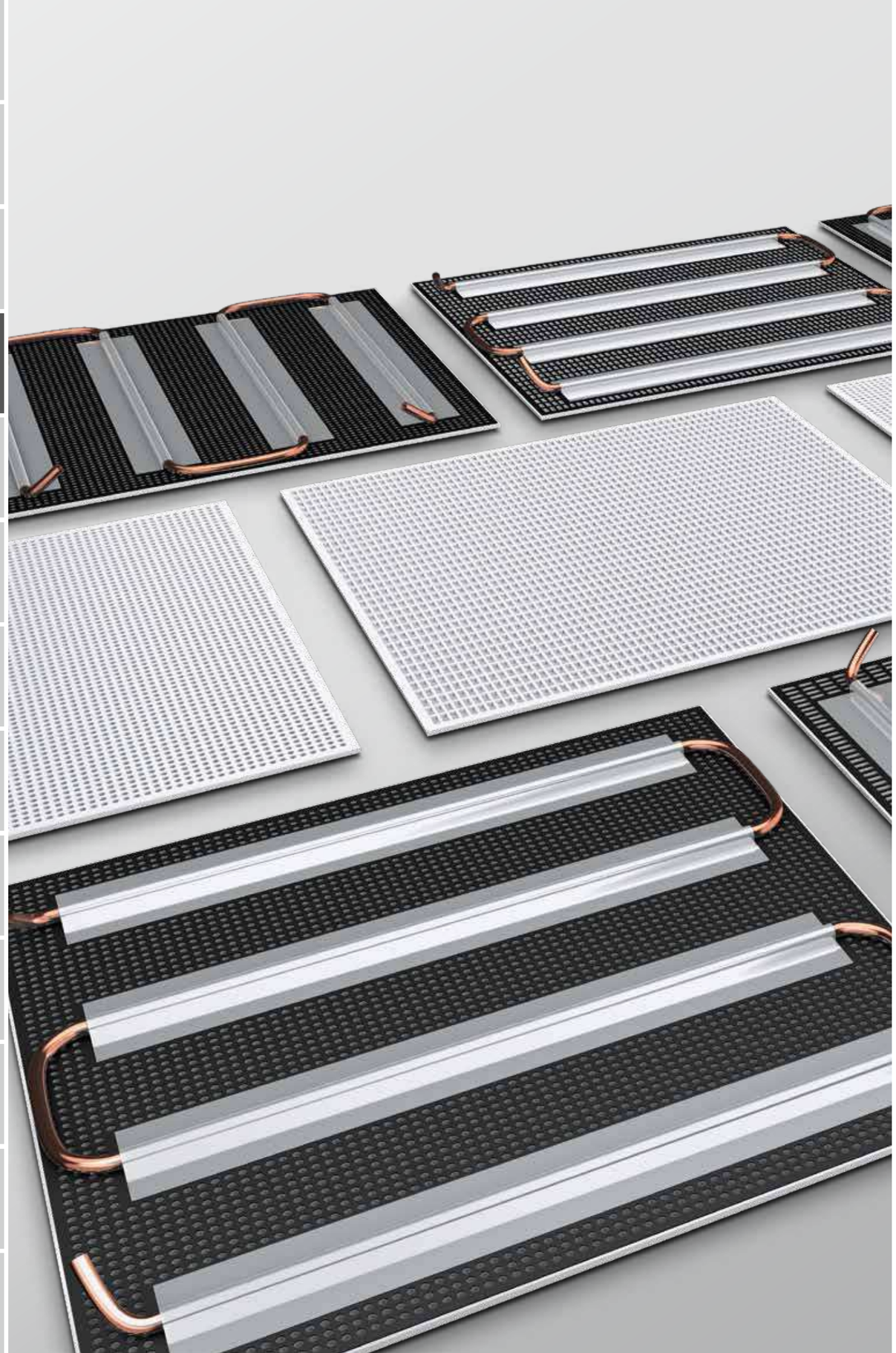
☐ Climate control
- ☐ wired → ☐ Comfort ☐ Object
- ☐ wireless → ☐ Comfort ☐ Object

☐ 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.*

CLIMALINE Gypsum Tile Ceilings Thermo Panel 4T

Precoated surface (similar to RAL 9003)



Gypsum tiles with a coated surface are delivered fitted with cooling registers to the building site. They are laid in a visible grid substructure.

Product Advantages

Easy assembly
Modern look
With coated surface
Sound-absorbing
Diffusion-closed

Areas of Application

Office and sales areas
Training and seminar rooms
Hospital rooms
Canteens
Foyer areas

Technical Data

Gypsum tile thickness	6.5 mm
Colouring	similar to RAL 9003
Operational weight	approx. 12.5 kg/m²
Water content	approx. 1.0 l/m²
Pipe meander	copper 12 x 0.35 mm
Heat flux profiles	aluminium
Centre distance	150 mm

Technical Properties

Building material class

Planking A2-s1, d0 according to EN 13501-1

Sound absorption

According to DIN EN ISO 354

Durability

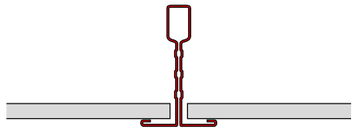
Stress class A according to DIN EN 13964
Diffusion resistant according to DIN 4726

Performance

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

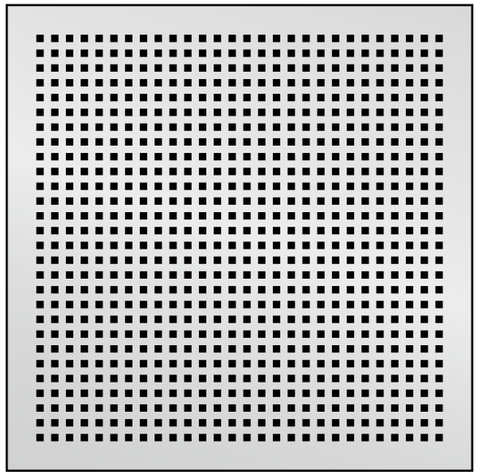
CE EN 13964 | According to DIN 18168

Visible T-Grid – Full Edge



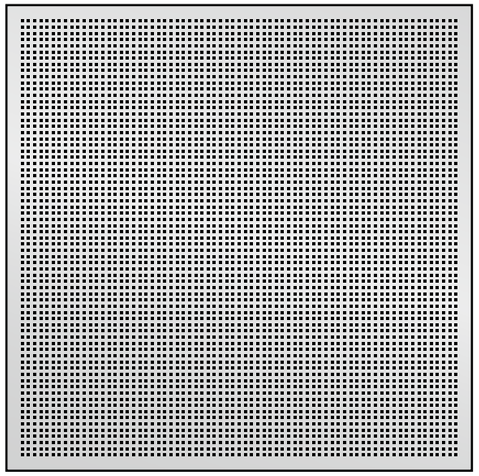
Full edge

Hole Patterns



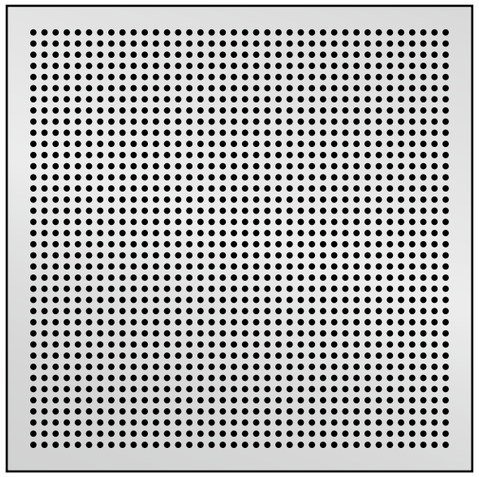
CLIMALINE Thermo Panel 4T Q 9/20

Module format: 625 x 625 mm x 6.5 mm
Perforation: 9 x 9 mm / Free cross section: 16.3 %
Centre distance of perforation: 20 mm



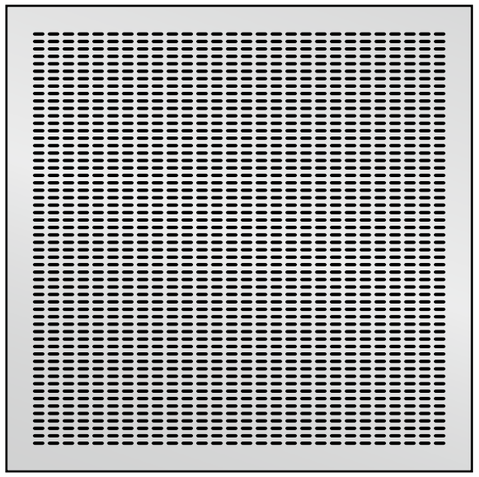
CLIMALINE Thermo Panel 4T Q 3.5/8.3

Module format: 625 x 625 mm x 6.5 mm
Perforation: 3.5 x 3.5 mm / Free cross section: 17.2 %
Centre distance of perforation: 8.3 mm



CLIMALINE Thermo Panel 4T R 6/15

Module format: 625 x 625 mm x 6.5 mm
Perforation: Ø 6 mm / Free cross section: 10.6 %
Centre distance of perforation: 15 mm

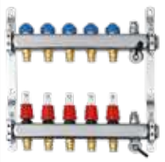


CLIMALINE Thermo Panel 4T T 14-4/20

Module format: 625 x 625 mm x 6.5 mm
Perforation: 14 x 4 mm / Free cross section: 21.1 %
Centre distance of perforation: 20 / 10 mm

Hydraulic Components

Unless otherwise explicitly requested, we forego internal piping in the rooms in the hydraulic design. We thus remain true to our idea of equipping each control area with a distributor.

Designation		Art. no.	Material	Dimension	Illustration
Connection hose between the tiles	Length: 1.0 m	293500	Stainless steel/poly-ethylene	Fitting 12 mm	
Hoses connecting the tiles to the distributor	Length: 1.0 m Length: 1.5 m Length: 2.0 m Length: 3.0 m Length: 4.0 m Length: 5.0 m Length: 7.0 m Length: 10.0 m	293500 293505 293511 317324 317329 317325 317326 317327	Stainless steel/poly-ethylene	Fitting 12 mm	
CLIMALINE VR adapter for distributor, 2 pieces per circuit		317807	Plastic	16 mm	
CLIMALINE brass adapter for internal piping to flex hose, 2 pieces per circuit		317806	Brass	16 x 12 mm	
CLIMALINE circuit distributor	for 2 circuits for 3 circuits for 4 circuits for 5 circuits for 6 circuits for 7 circuits for 8 circuits for 9 circuits for 10 circuits for 11 circuits for 12 circuits	317793 317794 317795 317796 317797 317798 317799 317800 317801 317802 317803	Stainless steel	for VR adapter 16 mm	

Accessories

Item	Designation	Art. no.	Illustration
Z 1	Assembly aid for Thermo Panel 4T module 625 x 625 mm	319157	
Z 2	Assembly aid for Thermo Panel 4T module 600 x 600 mm	319158	

Performance Data

Cooling output acc. to DIN EN 14240 per m² m²

CLIMALINE gypsum tile ceiling Thermo Panel 4T	
Pipe row spacing	150 mm
Δt	10 Kelvin
Cooling output	68.3 Watt
Active area ratio	0.96

Heating output acc. to DIN EN 14037 per m²

CLIMALINE gypsum tile ceiling Thermo Panel 4T	
Pipe row spacing	150 mm
Δt	15 Kelvin
Heating output	81.5 Watt
Active area ratio	0.98

Design

The following tables show the heating or cooling output per tile for the specified system temperatures. To ensure the hydraulic compensation, there should be the maximum number of tiles in a row and they should be installed in areas of the same size.

Cooling **System: Gypsum tile Thermo Panel 4T 625 x 625 mm, pipe rows / spacing: 4 / 150 mm**

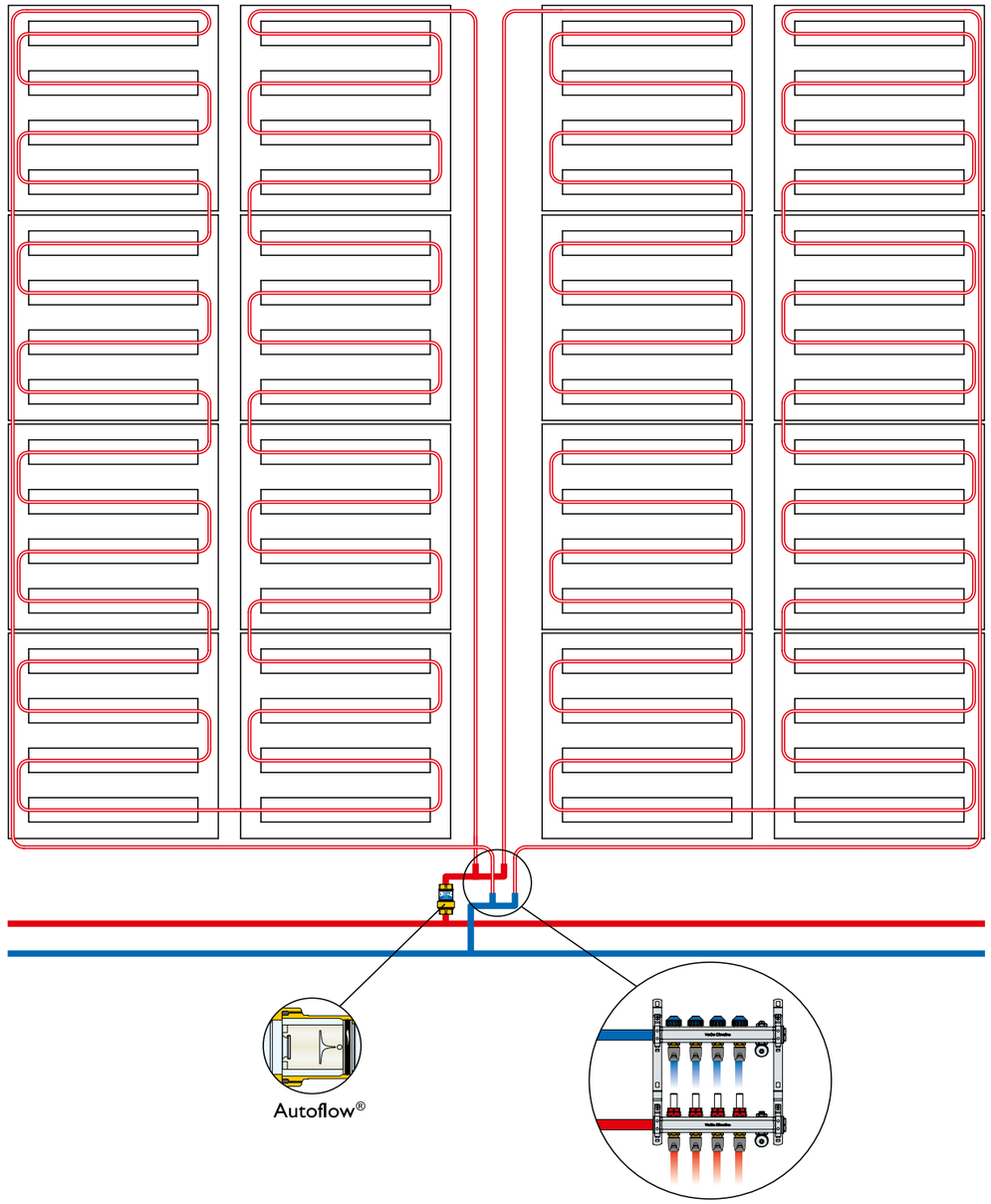
System temperature						
Supply temperature	15 °C	15 °C	15 °C	16 °C	16 °C	16 °C
Return temperature	17 °C	18 °C	19 °C	18 °C	19 °C	20 °C
Room temperature	26 °C	26 °C	26 °C	26 °C	26 °C	26 °C
Cooling output per tile	22.90 W	21.60 W	20.60 W	20.60 W	19.50 W	18.30 W
Mass flow per tile	9.90 kg/h	6.30 kg/h	4.40 kg/h	8.80 kg/h	5.50 kg/h	3.90 kg/h
Max. no. of tiles per circuit	12 pieces	17 pieces	22 pieces	14 pieces	19 pieces	23 pieces
Pressure loss per circuit	196.30 mbar	221.10 mbar	241.60 mbar	244.70 mbar	244.60 mbar	221.40 mbar

Heating **System: Gypsum tile Thermo Panel 4T 625 x 625 mm, pipe rows / spacing: 4 / 150 mm**

System temperature						
Supply temperature	35 °C	35 °C	35 °C	32 °C	32 °C	32 °C
Return temperature	32 °C	30 °C	28 °C	29 °C	27 °C	25 °C
Room temperature	20 °C	20 °C	20 °C	20 °C	20 °C	20 °C
Heating output per tile	25.70 W	23.80 W	21.90 W	20.00 W	18.10 W	16.20 W
Mass flow per tile	7.40 kg/h	4.10 kg/h	2.70 kg/h	5.70 kg/h	3.10 kg/h	1.90 kg/h
Max. no. of tiles per circuit	16 pieces	23 pieces	30 pieces	19 pieces	28 pieces	37 pieces
Pressure loss per circuit	244.80 mbar	230.00 mbar	225.10 mbar	248.90 mbar	241.20 mbar	233.60 mbar

Hydraulic Connection

The hydraulic connection of CLIMALINE gypsum tile ceilings Thermo Panel 4T is explicitly planned for every area of application.



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.*

CLIMALINE Metal Tile Ceilings

Strip grid assembly
Folding clamp assembly
Hook assembly

The almost infinite variations offered by metal tile ceilings and their various designs open up many advantages for designing cooling and heating areas. In particular, the accessibility and possibility of flexible layout by the creation of separate zones make the metal tile ceiling a real alternative to monolithic ceilings.

Product Advantages

Detailed assembly drawing
Modern look
Sound-absorbing
Accessible
Flexible room layout

Areas of Application

Office spaces
Training/seminar rooms
Sales rooms
Hospitals
Canteens

Technical Data

Colouring	according to RAL
Operational weight	approx. 15.0 kg/m²
Water content	approx. 1.0 l/m²
Pipe meander	copper 10 x 0.6 mm
Heat flux profiles	aluminium 51.5 mm wide

System Constructions

Strip grid assembly
Folding clamp assembly
Hook assembly

Technical Properties

Building material class

A2-s1, d0 according to EN 13501-1

Light reflection

Approx. 82 % (similar to RAL 9010)

Sound absorption

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

Performance

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

Durability

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

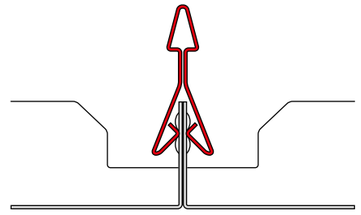
CE EN 13964

The tiles are manufactured according to the TAIM quality standard

Strip Grid Assembly

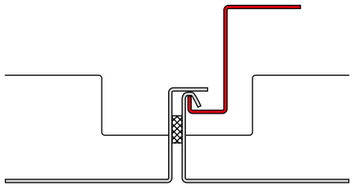
Strip grid system
(grid parallel or crosswise)

Folding Clamp Assembly



Folding clamp system

Hook Assembly



Hooked in a G-profile

Hydraulic Components

Unless otherwise explicitly requested, we forego internal piping in the rooms in the hydraulic design. We thus remain true to our idea of equipping each control area with a distributor.

Designation		Art. no.	Material	Dimension	Illustration
Connection hoses between the tiles	Length: 0.6 m Length: 0.8 m Length: 1.0 m Length: 1.5 m Length: 2.0 m Length: 2.5 m	293493 293495 293497 293532 293587 293597	Stainless steel/poly-ethylene	Fitting 10 mm	
Hoses connecting the tiles to the distributor	Length: 1.0 m Length: 1.5 m Length: 2.0 m Length: 2.5 m Length: 3.0 m Length: 4.0 m Length: 5.0 m Length: 6.0 m Length: 7.0 m Length: 8.0 m Length: 10.0 m	293575 293581 293586 293592 313515 313516 313517 313518 313519 313520 313521	Stainless steel/poly-ethylene	Fitting 10 x 12 mm	
CLIMALINE VR adapter for distributor, 2 pieces per circuit		317807	Plastic	16 mm	
CLIMALINE brass adapter for internal piping to flex hose, 2 pieces per circuit		317806	Brass	16 x 12 mm	
CLIMALINE circuit distributor	for 2 circuits for 3 circuits for 4 circuits for 5 circuits for 6 circuits for 7 circuits for 8 circuits for 9 circuits for 10 circuits for 11 circuits for 12 circuits	317793 317794 317795 317796 317797 317798 317799 317800 317801 317802 317803	Stainless steel	for VR adapter 16 mm	

Performance Data

Cooling output acc. to DIN EN 14240 per m²

CLIMALINE metal tile ceiling	
Pipe row spacing	60 mm
Δt	10 Kelvin
Cooling output	102 Watt
Active area ratio	1.00

Heating output acc. to DIN EN 14037 per m²

CLIMALINE metal tile ceiling	
Pipe row spacing	60 mm
Δt	15 Kelvin
Heating output	122 Watt
Active area ratio	1.00

Design

The following tables show the heating or cooling output per tile for the specified system temperatures. To ensure the hydraulic compensation, there should be the maximum number of tiles in a row and they should be installed in areas of the same size.

Cooling **System: Metal tile 1200 x 600 mm, pipe rows/spacing: 9/60 mm**

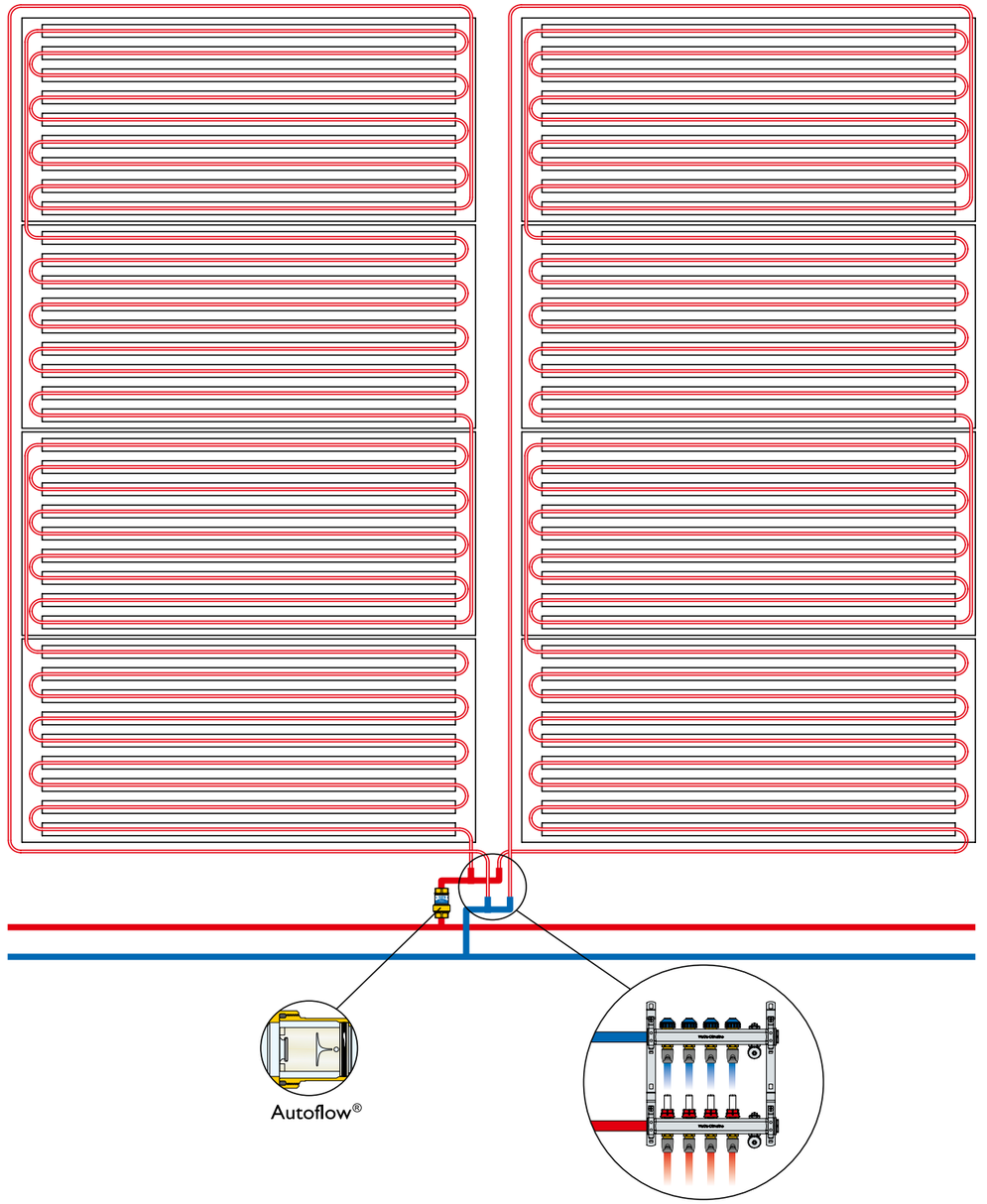
System temperature						
Supply temperature	15 °C	15 °C	15 °C	16 °C	16 °C	16 °C
Return temperature	17 °C	18 °C	19 °C	18 °C	19 °C	20 °C
Room temperature	26 °C	26 °C	26 °C	26 °C	26 °C	26 °C
Cooling output per tile	43.40 W	41.10 W	38.70 W	38.70 W	36.30 W	33.90 W
Mass flow per tile	19.00 kg/h	12.00 kg/h	8.00 kg/h	17.00 kg/h	11.00 kg/h	7.00 kg/h
Max. no. of tiles per circuit	5 pieces	6 pieces	8 pieces	5 pieces	7 pieces	9 pieces
Pressure loss per circuit	263.24 mbar	190.14 mbar	223.01 mbar	215.14 mbar	231.28 mbar	243.40 mbar

Heating **System: Metal tile 1200 x 600 mm, pipe rows/spacing: 9/60 mm**

System temperature						
Supply temperature	35 °C	35 °C	35 °C	32 °C	32 °C	32 °C
Return temperature	32 °C	30 °C	28 °C	29 °C	27 °C	25 °C
Room temperature	20 °C	20 °C	20 °C	20 °C	20 °C	20 °C
Heating output per tile	47.20 W	43.70 W	40.20 W	36.70 W	33.20 W	29.71 W
Mass flow per tile	14.00 kg/h	9.00 kg/h	9.00 kg/h	11.00 kg/h	9.00 kg/h	9.00 kg/h
Max. no. of tiles per circuit	6 pieces	9 pieces	9 pieces	7 pieces	8 pieces	8 pieces
Pressure loss per circuit	242.73 mbar	243.54 mbar	255.85 mbar	235.61 mbar	249.66 mbar	255.85 mbar

Hydraulic Connection

The hydraulic connection of CLIMALINE metal tile ceilings is explicitly planned for every area of application.



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

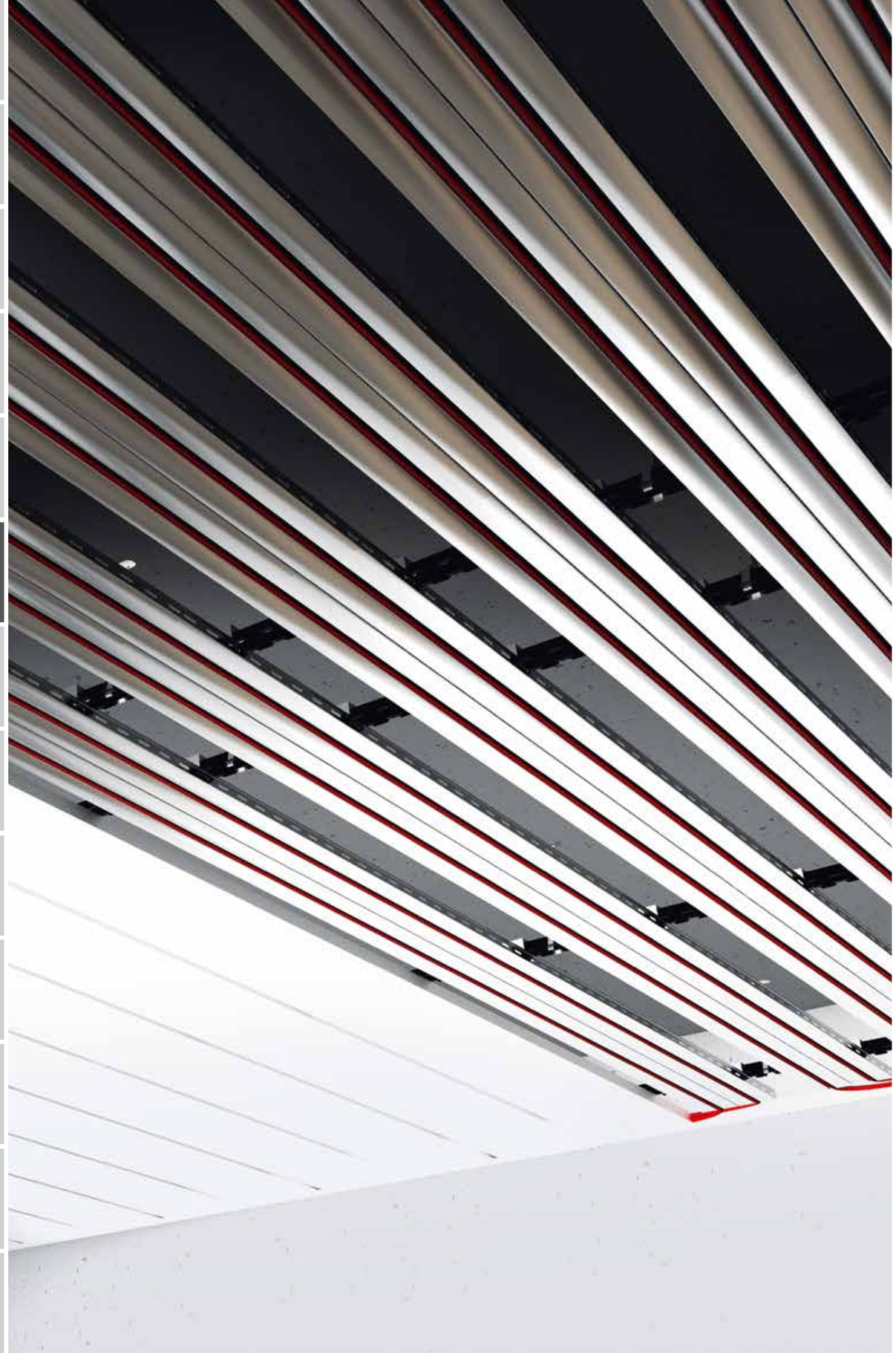
☐ Climate control
- ☐ wired → ☐ Comfort ☐ Object
- ☐ wireless → ☐ Comfort ☐ Object

☐ 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.*

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 (metal knock-in anchor)	*****	pieces	1.3	
2	Nonius – upper part, available lengths: 200 / 300 / 400 / 500 / 600 / 700 / 800 / 900 / 1000 / 1100 mm	*****	pieces	1.3	
3	Nonius – lower part, for the panel supporting rail	15506	pieces	1.3	
4	Nonius – safety splint	*****	pieces	2.6	
5	Supporting rail KS 50, for panel KS 285, aluminium 0.8 mm	20277	m	0.78	
6	CLIMALINE climate profile Type A 100 / 27 / 0.7 mm aluminium, length: 4000 mm	177974	m	6.7	
7	CLIMALINE cross connector for CLIMALINE climate profile, packing unit: 75 pieces	184765	pieces	5.85	
8	CLIMALINE composite pipe 16 x 2 mm, diffusion-closed — Quantity: 200 m / 500 m	317791 317792	m	8	
9	Panel KS 285, width: 285 mm — Surface: smooth / perforated	209289 209500	m	3.33	
10	Longitudinal connector for panel KS 285	229881	pieces	0.5	
11	Head piece for panel KS 285	232073	pieces	0.5	
12	Safety clip BW 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.

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.

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.

Preparation of the ceiling areas

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

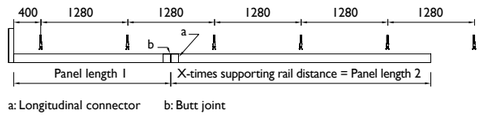
Panel butt joints must be provided for panel lengths over 6 m.

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.

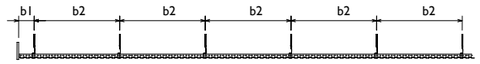
When preparing installation, the manufacturer guidelines for the following must be followed:

- 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 m² (for exact length of pipe see hydraulic calculation on page 69).

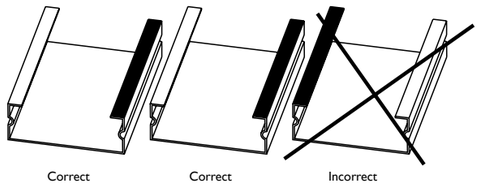
Therefore various control circuits are created, which are subsequently connected to appropriately dimensioned circuit distributors using plug-ins.

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.

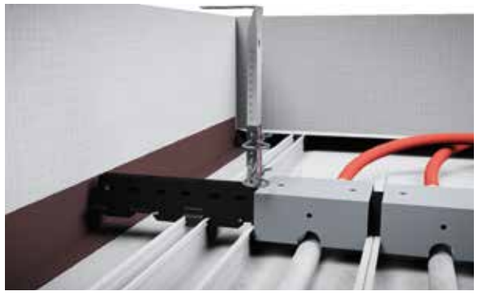
Progressive panel installation has to ensure a flawless ceiling design and an even levelled area – with sliding panels.

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.

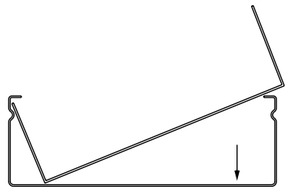
Panels are never tightly fitted between limiting components due to material expansion.

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/m² surface weight. With higher surface weight, the construction distances are adapted in accordance with manufacturer's specifications.

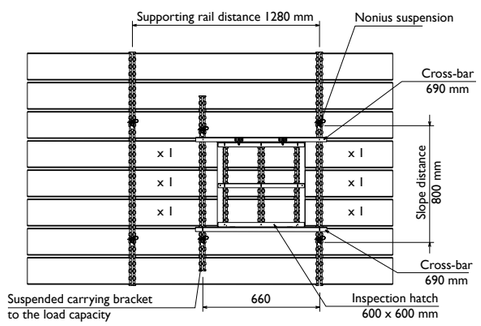
Installing an inspection hatch

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

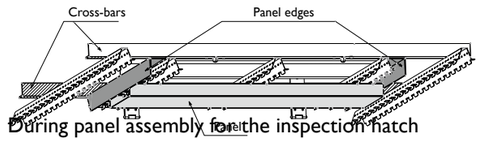
The bars are placed on mounting rails and, depending on the orientation of the module, are screwed with self-locking M5 hexagon socket screws, washers and hexagon nuts.

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.



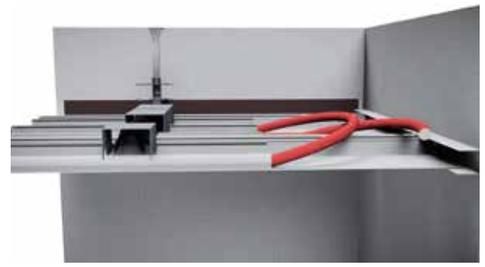
During panel assembly for the inspection hatch

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

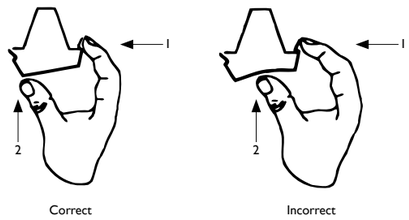
Head piece for panel end

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 m² 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 m²	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 m²	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

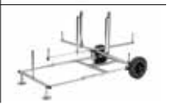
VDI directive 6034 must be observed.

Hydraulic Components

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

Designation		Art. no.	Material	Dimension	Illustration
CLIMALINE composite pipe, diffusion-closed		317791 317792	Plastic/ aluminium	16 x 2 mm, length: 200 m 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 for 3 circuits for 4 circuits for 5 circuits for 6 circuits for 7 circuits for 8 circuits for 9 circuits for 10 circuits for 11 circuits for 12 circuits	317793 317794 317795 317796 317797 317798 317799 317800 317801 317802 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, consisting of deburring bit and interchangeable handle	162787	
W 3	Pipe bending tool	162785	
W 4	Pipe uncoiler 4-arm, specially designed for the use of composite pipes	163231	

Notes

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

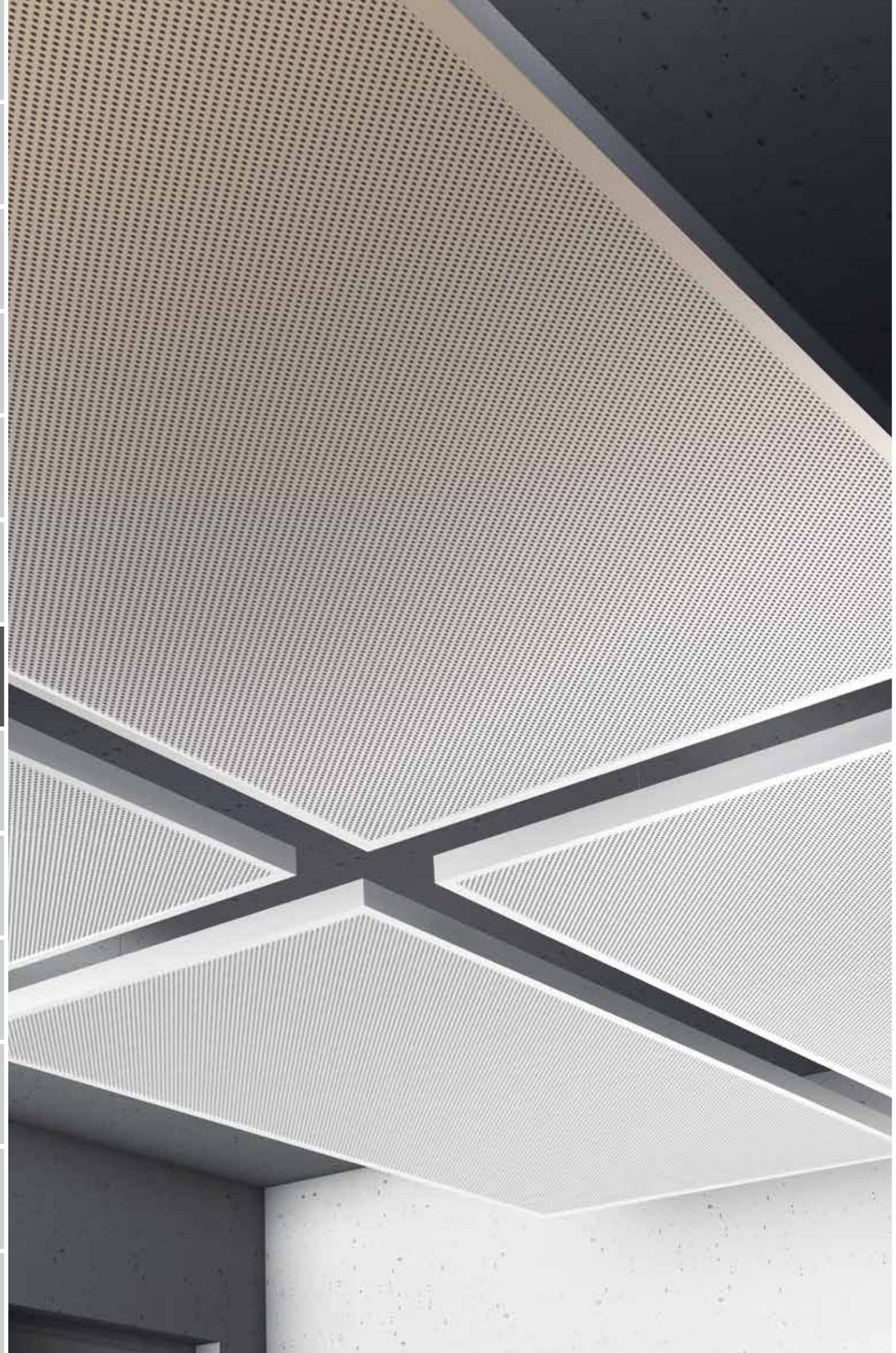
☐ Climate control
- ☐ wired → ☐ Comfort ☐ Object
- ☐ wireless → ☐ Comfort ☐ Object

☐ 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.*

CLIMALINE Free Floating Ceiling Mono

Monolithic, smooth, perforated



The planning of cooling and heating areas in free floating geometries, without connections to adjacent building elements, offers a number of advantages. For cooling, this version basically leads to an enormous increase in the convective component and therefore to an enormous increase in performance. In architecture, too, planning with metal free floating ceilings also opens up very different possibilities and significantly simplifies the design of chain dimensioning.

Product Advantages

Significantly higher performance
Highly sound-absorbing
Homogeneous appearance
Easy planning of control zones
Simple hydraulic control

Areas of Application

Office floors
Training/seminar rooms
Sales areas
Open-plan offices
Meeting rooms

Technical Data

Colouring	according to RAL
Operational weight	approx. 15.0 kg/m²
Water content	approx. 1.0 l/m²
Pipe meander	copper 10 x 0.6 mm
Heat flux profiles	aluminium 51.5 mm wide

System Constructions

Monolithic
Braced by cross-bars
Suspended by stainless steel ropes

Technical Properties

Building material class

A2-s1, d0 according to EN 13501-1

Light reflection

Approx. 82 % (similar to RAL 9010)

Sound absorption

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

Performance

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

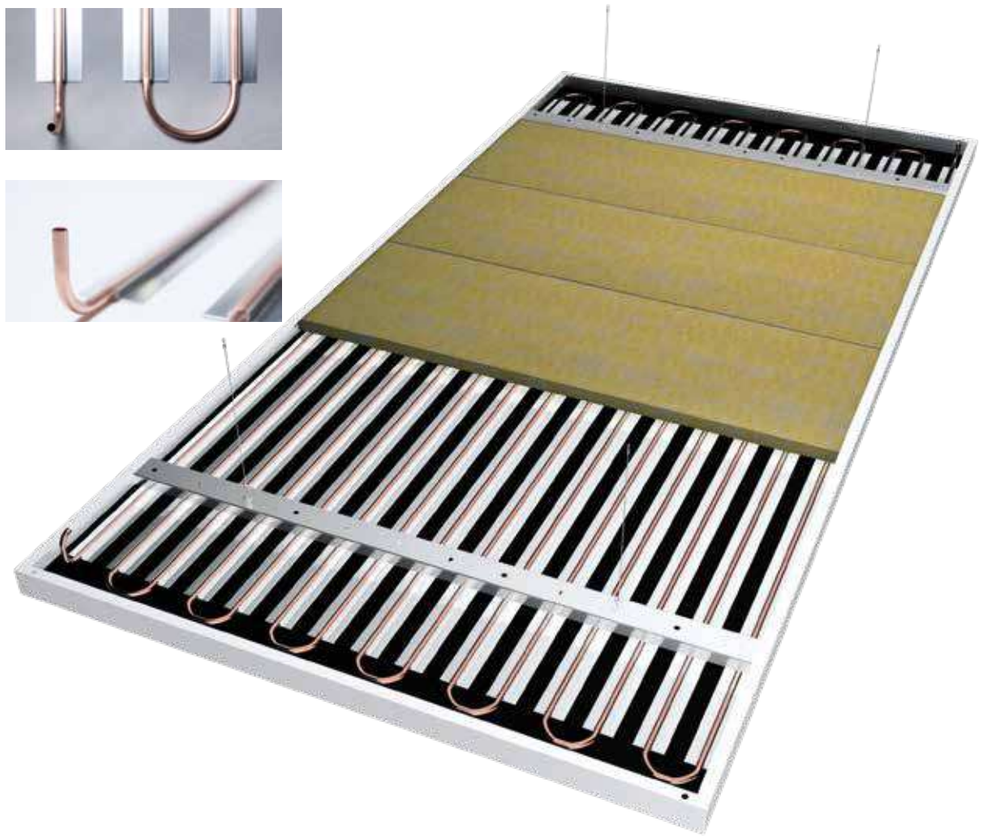
Durability

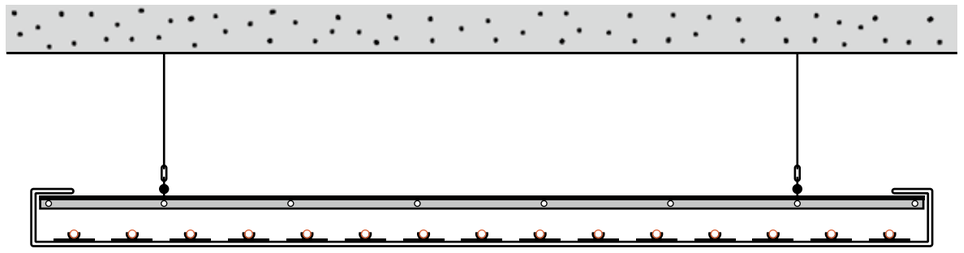
Stress class A
according to DIN EN 13964 table 7 and 8
Diffusion resistant according to DIN 4726

CE EN 13964 | Metal tiles are manufactured according to the TAIM quality standard

Construction

Each CLIMALINE free floating ceiling Mono is equipped with a pressed-in register. We either deliver a distributor for each free floating ceiling or we combine several free floating ceilings via one distributor. We plan the hydraulic connection and the individual control of each control zone to your specifications.



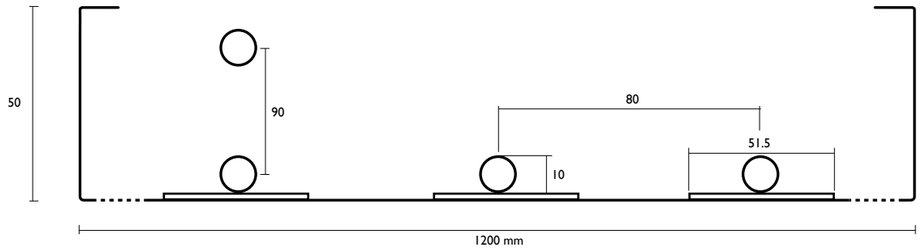


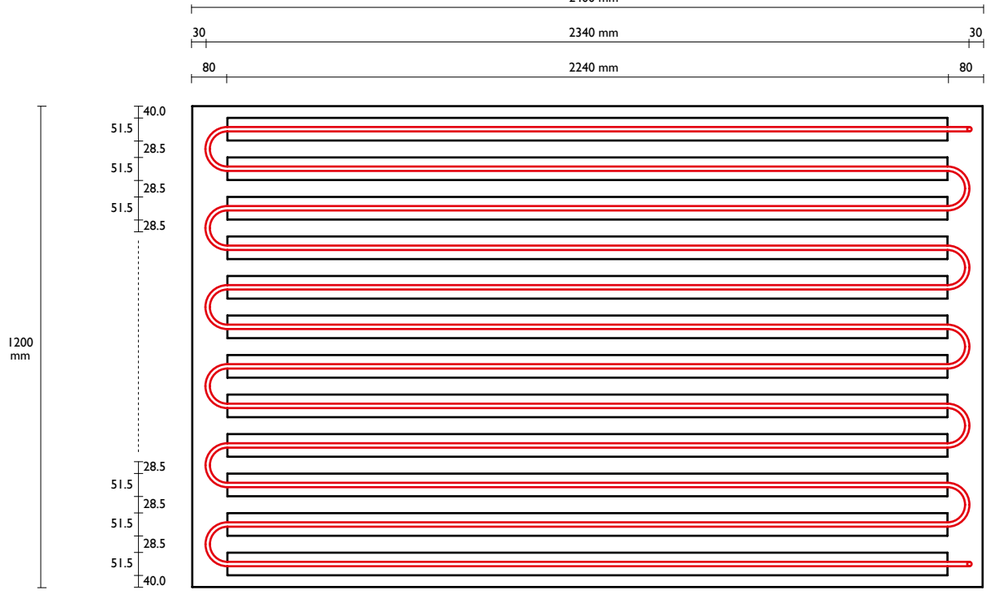
Planked Type A
D Gypsum
Gypsum Planked Type
Gypsum Tile Ceilings
Metal Tile Ceilings
Panel Ceiling Linear
Free Floating Ceiling Mono
Free Floating Ceiling Linear
Acoustical Effectivity
Cool Sets Water Chillers
Air Systems
Measurement & Contr. Techn.
Annex

Visible side of the free floating ceiling

The visible area of the CLIMALINE Climaline free floating ceiling Mono is available in both a smooth and a perforated design.

Free floating and register dimensi-

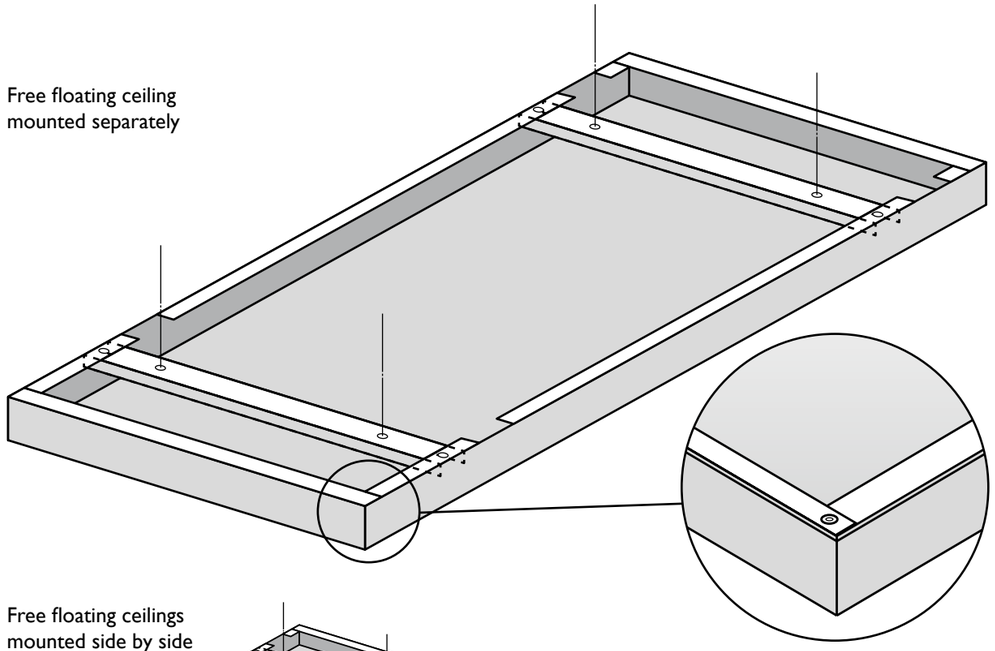




Assembly

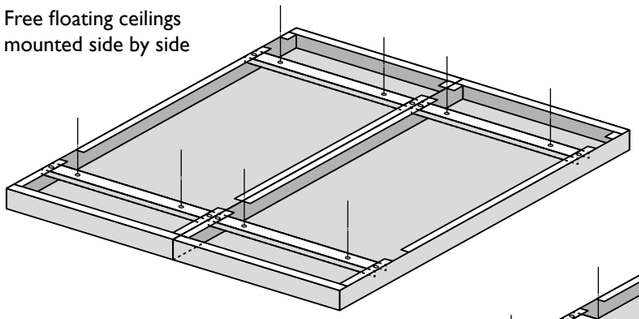
CLIMALINE free floating ceilings Mono can be mounted either individually or combined according to the planned use and room geometries. We also plan the design and hydraulic calculations according to your specifications.

Free floating ceiling mounted separately

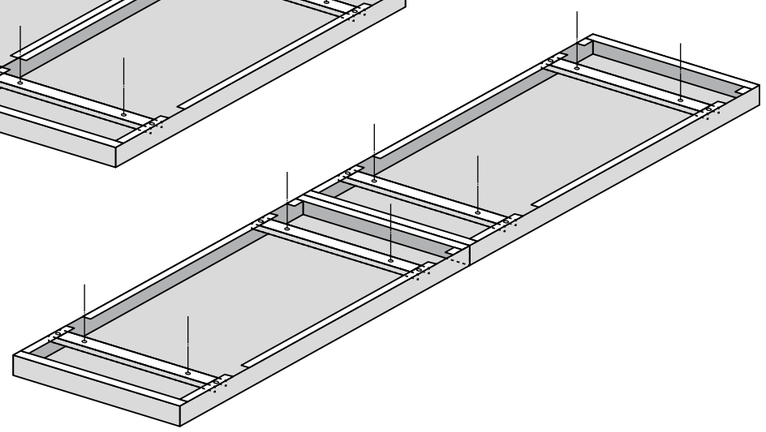


Rear surrounding edge can be riveted as an option

Free floating ceilings mounted side by side



Free floating ceilings mounted one behind the other



Hydraulic Components

Unless otherwise explicitly requested, we forego internal piping in the rooms in the hydraulic design. We thus remain true to our idea of equipping each control area with a distributor.

Designation		Art. no.	Material	Dimension	Illustration
Connection hoses between the registers	Length: 0.6 m Length: 0.8 m Length: 1.0 m Length: 1.5 m Length: 2.0 m Length: 2.5 m	293493 293495 293497 293532 293587 293597	Stainless steel/poly-ethylene	Fitting 10 mm	
Hoses connecting the registers to the distributor	Length: 1.0 m Length: 1.5 m Length: 2.0 m Length: 2.5 m Length: 3.0 m Length: 4.0 m Length: 5.0 m Length: 6.0 m Length: 7.0 m Length: 8.0 m Length: 10.0 m	293575 293581 293586 293592 313515 313516 313517 313518 313519 313520 313521	Stainless steel/poly-ethylene	Fitting 10 x 12 mm	
CLIMALINE VR adapter for distributor, 2 pieces per circuit		317807	Plastic	16 mm	
CLIMALINE brass adapter for internal piping to flex hose, 2 pieces per circuit		317806	Brass	16 x 12 mm	
CLIMALINE circuit distributor	for 2 circuits for 3 circuits for 4 circuits for 5 circuits for 6 circuits for 7 circuits for 8 circuits for 9 circuits for 10 circuits for 11 circuits for 12 circuits	317793 317794 317795 317796 317797 317798 317799 317800 317801 317802 317803	Stainless steel	for VR adapter 16 mm	

Performance Data

Cooling output acc. to DIN EN 14240 per m²

CLIMALINE free floating ceiling Mono	
Pipe row spacing	80 mm
Δt	10 Kelvin
Cooling output	102 Watt
Active area ratio	1.00

Heating output acc. to DIN EN 14037 per m²

CLIMALINE free floating ceiling Mono	
Pipe row spacing	80 mm
Δt	15 Kelvin
Heating output	122 Watt
Active area ratio	1.00

Design

The following tables show the pressure losses and flow depending on the cooling capacity per free floating ceiling at the specified system temperatures. The calculation of pressure losses and the required mass of water is explicitly performed for every application.

Cooling **System: Free floating ceiling Mono 2400 x 1200 mm, pipe rows / spacing: 15 / 80 mm**

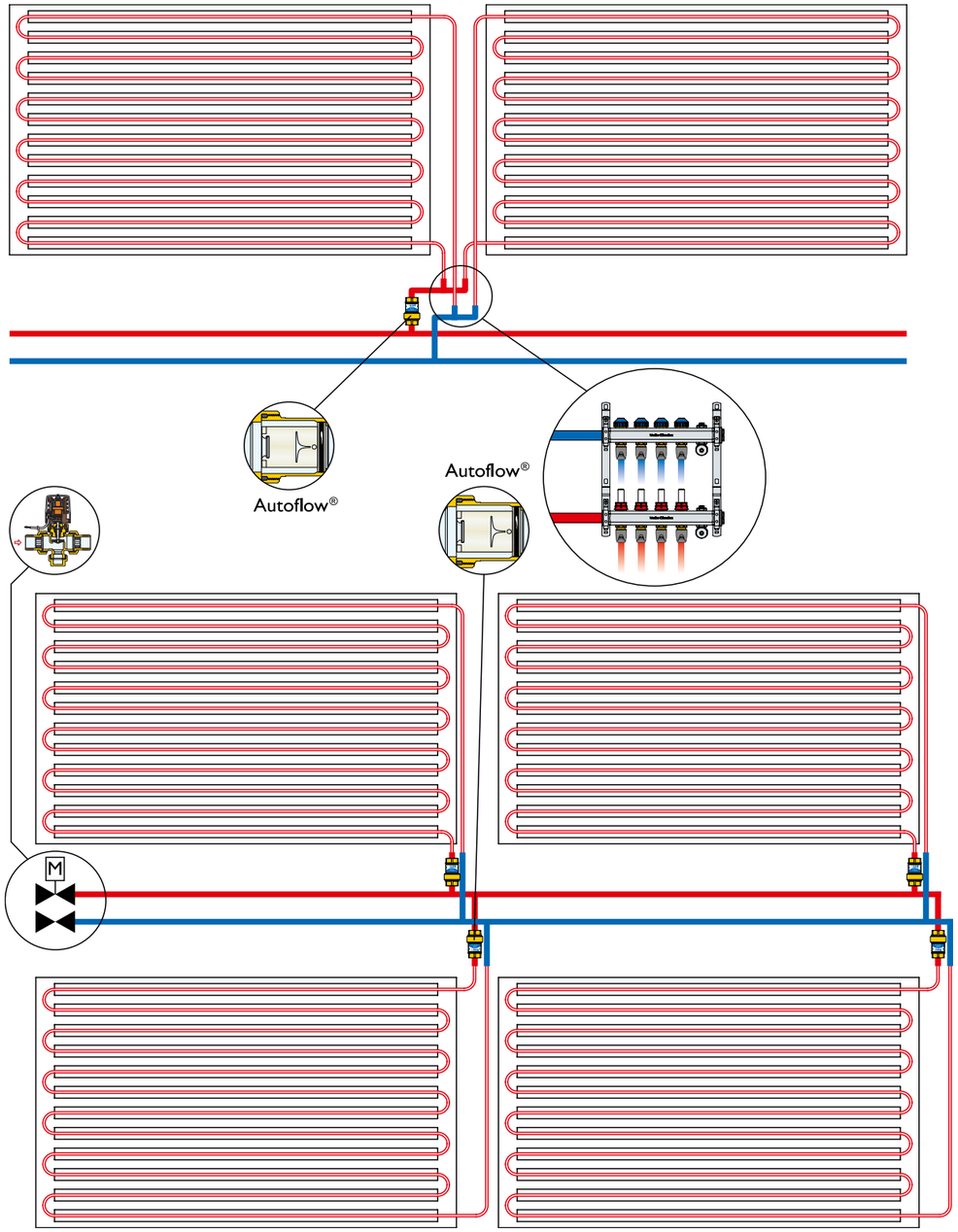
System temperature						
Supply temperature	15 °C	15 °C	15 °C	16 °C	16 °C	16 °C
Return temperature	17 °C	18 °C	19 °C	18 °C	19 °C	20 °C
Room temperature	26 °C	26 °C	26 °C	26 °C	26 °C	26 °C
Cooling output per free float. ceiling	293.76 W	279.07 W	264.38 W	264.38 W	249.69 W	235.00 W
Mass flow per free float. ceiling	126.32 kg/h	80.00 kg/h	63.70 kg/h	113.69 kg/h	71.58 kg/h	61.80 kg/h
Pressure loss per free float. ceiling	316.32 mbar	142.23 mbar	93.63 mbar	263.06 mbar	117.07 mbar	90.53 mbar

Heating **System: Free floating ceiling Mono 2400 x 1200 mm, pipe rows / spacing: 15 / 80 mm**

System temperature						
Supply temperature	35 °C	35 °C	35 °C	32 °C	32 °C	32 °C
Return temperature	32 °C	30 °C	28 °C	29 °C	27 °C	25 °C
Room temperature	20 °C	20 °C	20 °C	20 °C	20 °C	20 °C
Heating output per free float. ceiling	316.22 W	292.80 W	269.36 W	245.95 W	222.53 W	199.09 W
Mass flow per free float. ceiling	90.65 kg/h	50.36 kg/h	33.09 kg/h	70.51 kg/h	38.28 kg/h	24.46 kg/h
Pressure loss per free float. ceiling	177.00 mbar	63.28 mbar	30.35 mbar	114.02 mbar	38.15 mbar	17.88 mbar

Hydraulic Connection

The hydraulic connection of the CLIMALINE free floating ceilings Mono is explicitly planned for every area of application.



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.*

CLIMALINE Free Floating Ceiling Linear

Panel, smooth or perforated

The design of the area to be tempered with free floating ceilings usually focuses on the window axes of a building. The smallest control zones can therefore be outlined and planned in accordance with the requirements for use. A defined power density can be planned per axle and controlled via the measurement and control technology as required.

Product Advantages

Considerably higher performance
Highly sound-absorbing
Integrated workstation light
Easy planning of control zones
Simple hydraulic control

Areas of Application

Office floors
Training/seminar rooms
Sales areas
Open-plan offices
Meeting rooms

Technical Data

Colouring	according to RAL
Operational weight	approx. 15.0 kg/m²
Water content	approx. 1.0 l/m²
Pipe meander	copper 10 x 0.6 mm
Heat flux profiles	aluminium 51.5 mm wide

System Constructions

Linear arrangement of panels
Strengthened via supporting rails
Suspended by stainless steel ropes
Perforated or smooth design

Technical Properties

Building material class

A2-s1, d0 according to EN 13501-1

Light reflection

Approx. 82 % (similar to RAL 9010)

Sound absorption

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

Performance

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

Durability

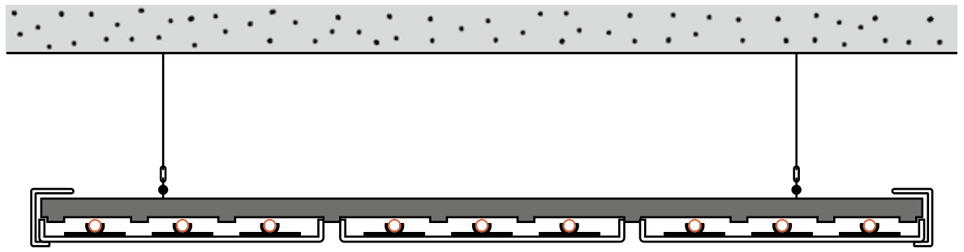
Stress class C
according to DIN EN 13964 table 7 and 8
Diffusion resistant according to DIN 4726

CE EN 13964

The panels are manufactured according to the TAIM quality standard

Construction

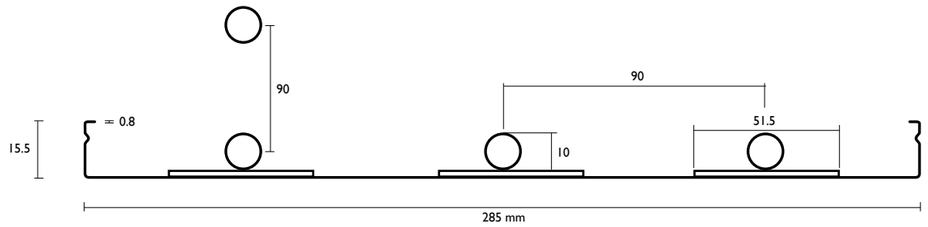
Each CLIMALINE free floating ceiling Linear is equipped with a pressed-in register. We either deliver a distributor for each free floating ceiling or we combine several free floating ceilings via one distributor. We plan the hydraulic connection and the individual control of each control zone to your specifications.

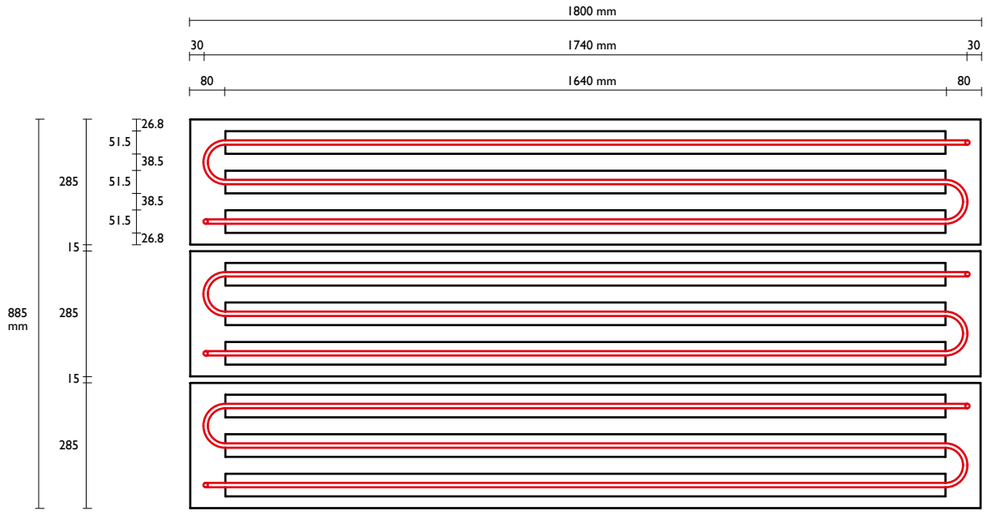


Visible side of the free floating ceiling

The visible area of the CLIMALINE Climaline free floating ceiling Linear is available in both a smooth and a perforated design.

Panel and register dimen-

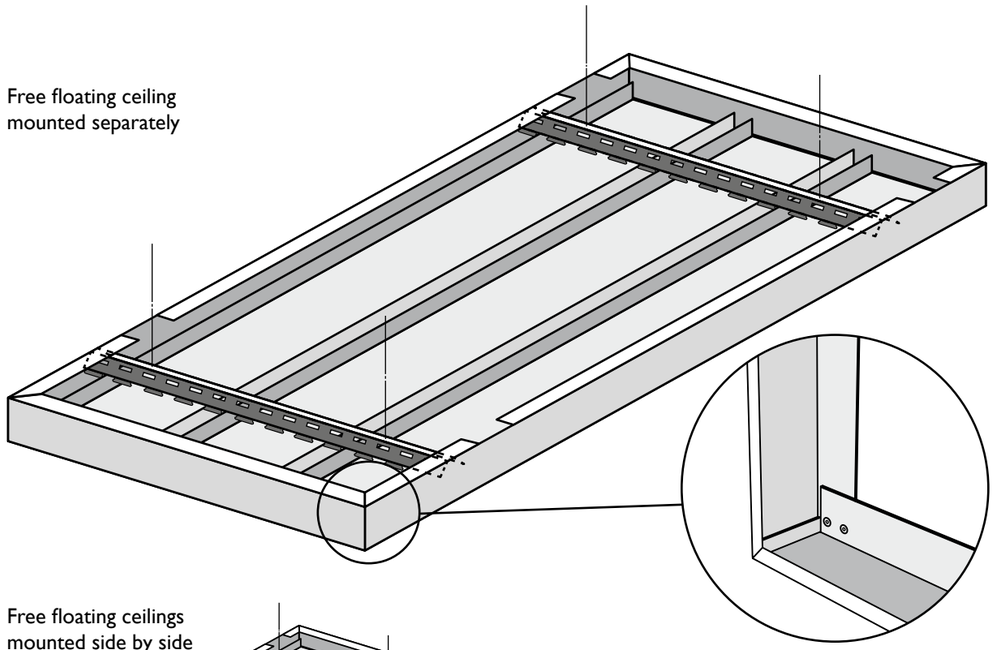




Assembly

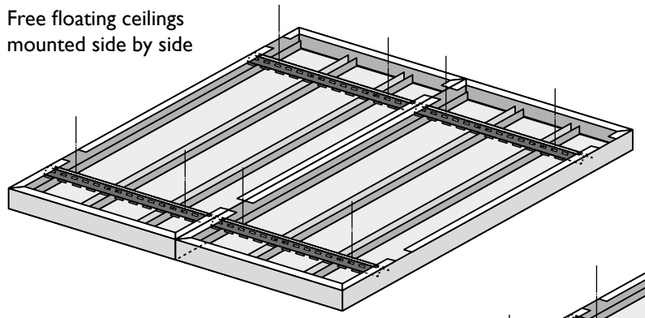
CLIMALINE free floating ceilings Linear can be mounted either individually or combined according to the planned use and room geometries. Here, too, we plan the design and hydraulic calculations according to your specifications.

Free floating ceiling mounted separately

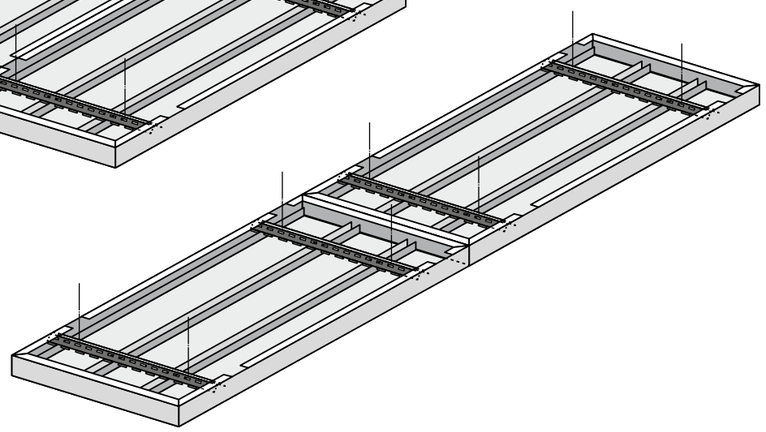


Back lip to edge mitre (view: visible side)

Free floating ceilings mounted side by side



Free floating ceilings mounted one behind the other



Planked Type A
D Gypsum
Gypsum Planked Type
Gypsum Tile Ceilings
Metal Tile Ceilings
Panel Ceiling Linear
Free Floating Ceiling Mono
Free Floating Ceiling Linear
Acoustical Effectivity
Cool Sets Water Chillers
Air Systems
Measurement & Contr. Techn.
Annex

Hydraulic Components

Unless otherwise explicitly requested, we forego internal piping in the rooms in the hydraulic design. We thus remain true to our idea of equipping each control area with a distributor.

Designation		Art. no.	Material	Dimension	Illustration
Connection hoses between the registers	Length: 0.6 m Length: 0.8 m Length: 1.0 m Length: 1.5 m Length: 2.0 m Length: 2.5 m	293493 293495 293497 293532 293587 293597	Stainless steel/poly-ethylene	Fitting 10 mm	
Hoses connecting the registers to the distributor	Length: 1.0 m Length: 1.5 m Length: 2.0 m Length: 2.5 m Length: 3.0 m Length: 4.0 m Length: 5.0 m Length: 6.0 m Length: 7.0 m Length: 8.0 m Length: 10.0 m	293575 293581 293586 293592 313515 313516 313517 313518 313519 313520 313521	Stainless steel/poly-ethylene	Fitting 10 x 12 mm	
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CLIMALINE brass adapter for internal piping to flex hose, 2 pieces per circuit		317806	Brass	16 x 12 mm	
CLIMALINE circuit distributor	for 2 circuits for 3 circuits for 4 circuits for 5 circuits for 6 circuits for 7 circuits for 8 circuits for 9 circuits for 10 circuits for 11 circuits for 12 circuits	317793 317794 317795 317796 317797 317798 317799 317800 317801 317802 317803	Stainless steel	for VR adapter 16 mm	

Performance Data

Cooling output acc. to DIN EN 14240

CLIMALINE free floating ceiling Linear	
Pipe row spacing	90 mm
Δt	10 Kelvin
Cooling output	132 Watt
Active area ratio	0.88

Heating output acc. to DIN EN 14037

CLIMALINE free floating ceiling Linear	
Pipe row spacing	90 mm
Δt	15 Kelvin
Heating output	143 Watt
Active area ratio	0.88

Design

The following tables show the pressure losses and flow depending on the cooling capacity per free floating ceiling at the specified system temperatures. The calculation of pressure losses and the required mass of water is explicitly performed for every application.

Cooling **System: Free floating ceiling Linear 1800 x 1185 mm**

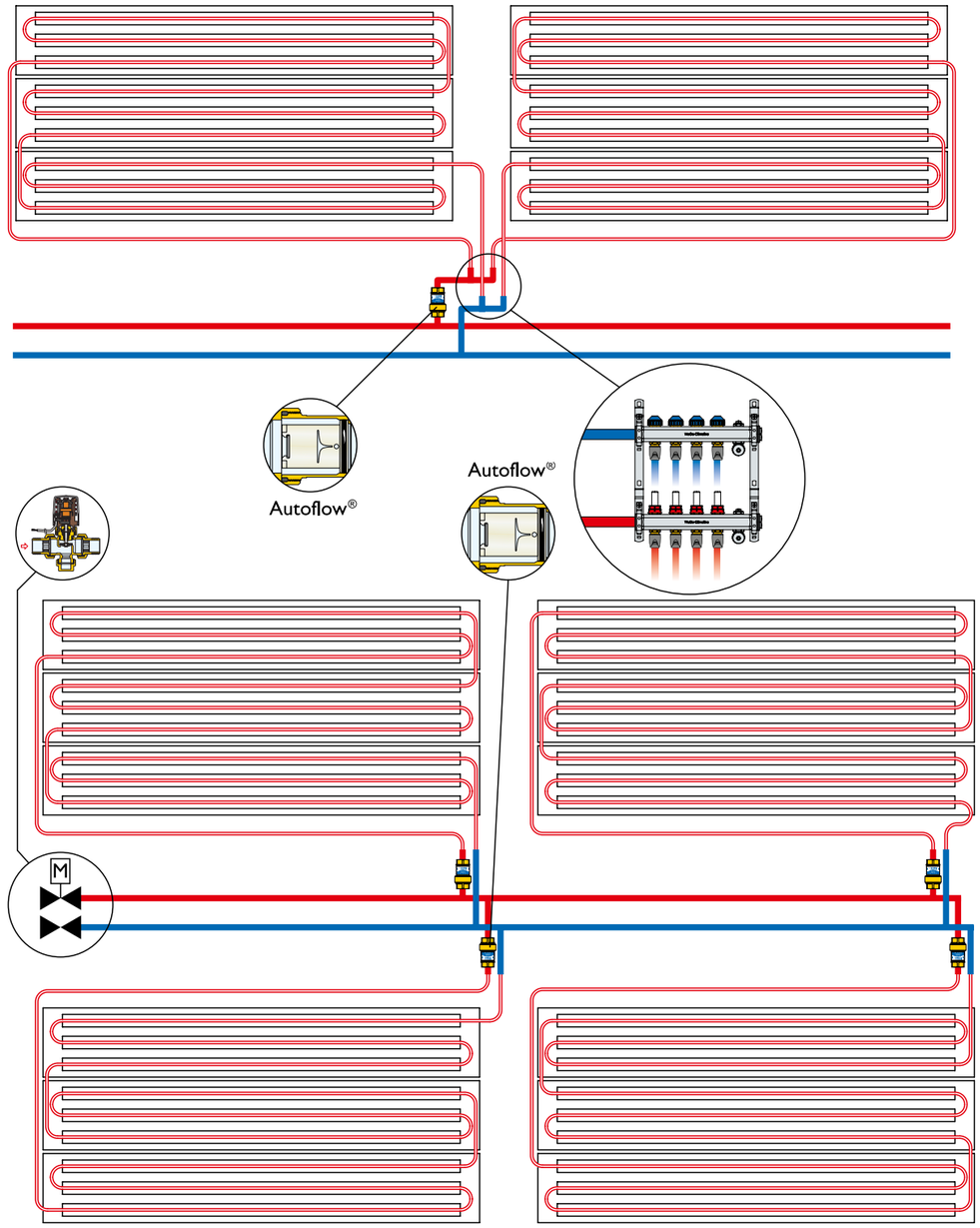
System temperature						
Supply temperature	15 °C	15 °C	15 °C	16 °C	16 °C	16 °C
Return temperature	17 °C	18 °C	19 °C	18 °C	19 °C	20 °C
Room temperature	26 °C	26 °C	26 °C	26 °C	26 °C	26 °C
Cooling output per free float. ceiling	277.30 W	263.40 W	249.60 W	249.60 W	235.70 W	221.80 W
Mass flow per free float. ceiling	108.37 kg/h	68.82 kg/h	48.90 kg/h	97.80 kg/h	61.58 kg/h	43.47 kg/h
Pressure loss per free float. ceiling	179.59 mbar	80.75 mbar	44.40 mbar	149.35 mbar	66.47 mbar	36.13 mbar

Heating **System: Free floating ceiling Linear 1800 x 1185 mm**

System temperature						
Supply temperature	35 °C	35 °C	35 °C	32 °C	32 °C	32 °C
Return temperature	32 °C	30 °C	28 °C	29 °C	27 °C	25 °C
Room temperature	20 °C	20 °C	20 °C	20 °C	20 °C	20 °C
Heating output per free float. ceiling	274.50 W	254.20 W	233.80 W	213.50 W	193.20 W	172.80 W
Mass flow per free float. ceiling	71.72 kg/h	39.86 kg/h	28.47 kg/h	55.78 kg/h	30.29 kg/h	19.35 kg/h
Pressure loss per free float. ceiling	86.79 mbar	31.04 mbar	17.23 mbar	55.91 mbar	19.21 mbar	8.76 mbar

Hydraulic Connection

The hydraulic connection of the CLIMALINE free floating ceilings Linear is explicitly planned for every area of application.



LinearLux LED Light

As a smart addition to our free floating ceiling Linear the symmetrically integrated LinearLux LED light has been developed. In contrast to closed thermally activated ceilings, where the lights mostly are suspended, in free floating systems it makes sense to integrate the lighting.

Product Advantages

Lay-in assembly
Flat case of aluminium
Freely dimmable
Suitable for workstations
Highly efficient LED technology

Areas of Application

Workstations
Multifunction rooms
Open-plan offices
Foyers
Other workplaces

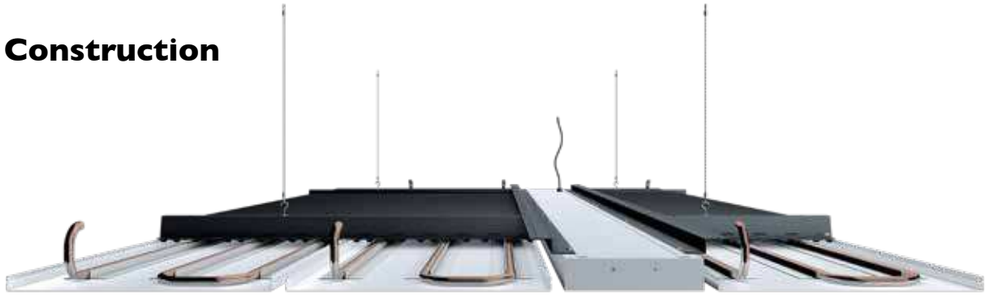
Technical Data

System suitability	Free floating ceiling Linear
Material case	extruded aluminium profile
Colour case	RAL 9006 (white aluminium)
Operational weight	4.5 kg/m
Assembly dimension	150 mm wide, up to 6000 mm long
Thickness	35 mm
Coverings	micro prism or opal

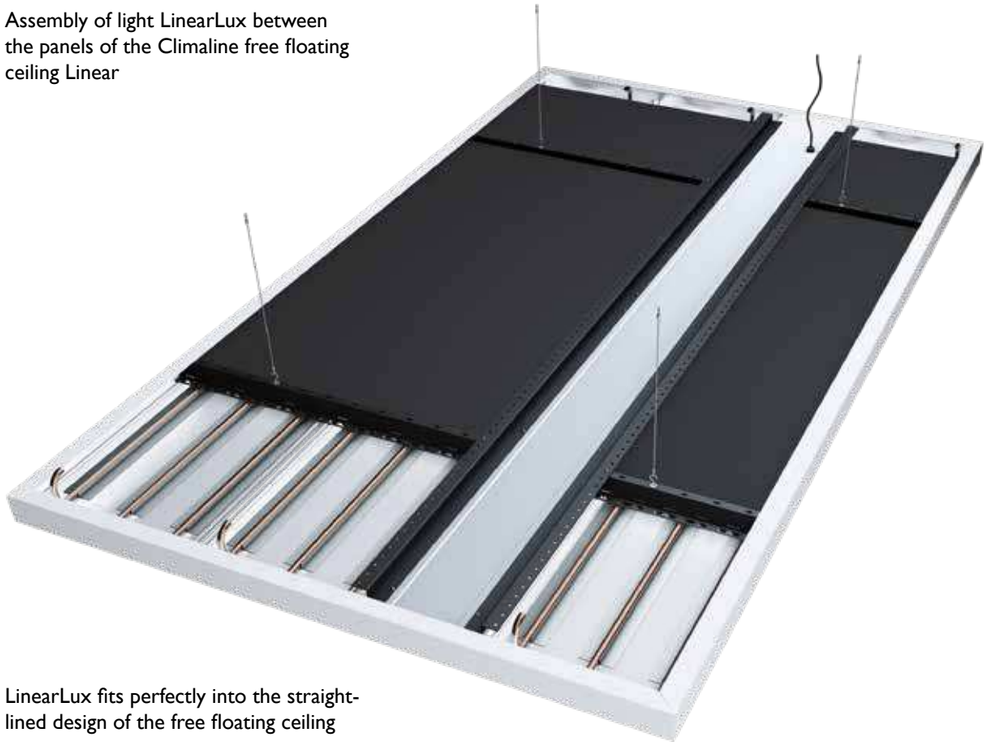
Technical Properties

Protection type	IP 20
Protection class	I
Power input	23 W per metre (up to 43 W)
System efficiency	up to 130 lm/W
Supply data	230 V AC, 50/60 Hz
Mounting LED	LED 21 W per metre (up to 40 W)
Light colours	3000 K (warm white), 4000 K (neutral white)

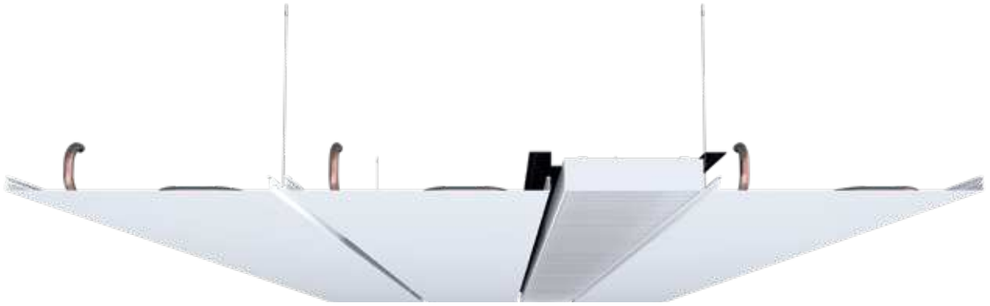
Construction



Assembly of light LinearLux between the panels of the Climaline free floating ceiling Linear



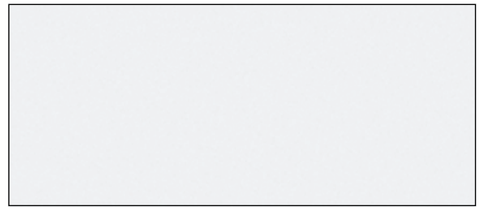
LinearLux fits perfectly into the straight-lined design of the free floating ceiling



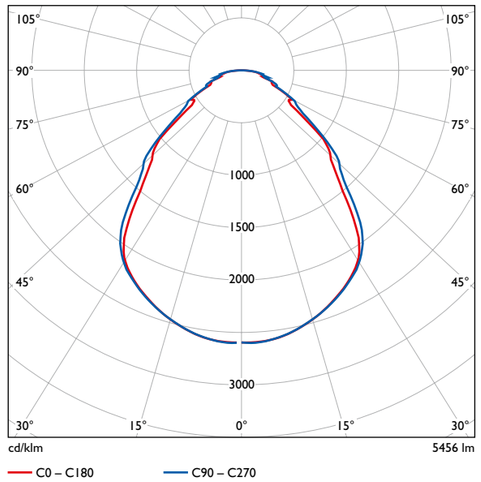
Planked Type A
D Gypsum
Gypsum Planked Type
Gypsum Tile Ceilings
Metal Tile Ceilings
Panel Ceiling Linear
Free Floating Ceiling Mono
Free Floating Ceiling Linear
Acoustical Effectivity
Cool Sets Water Chillers
Air Systems
Measurement & Contr. Techn.
Annex

Light distribution

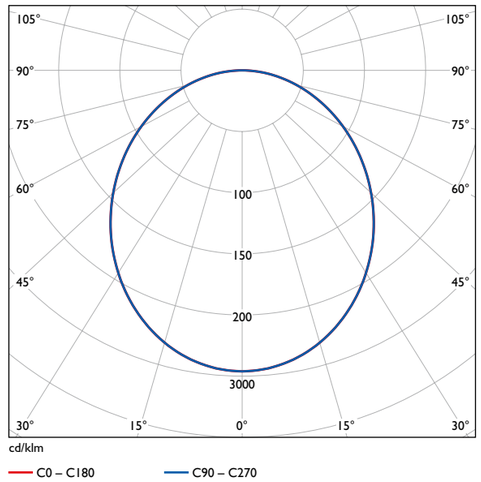
Fully surfaced light covering with highly efficient micro prism screen for anti-glare light distribution



Fully surfaced light covering with opal PMMA-screen for widely spread light distribution

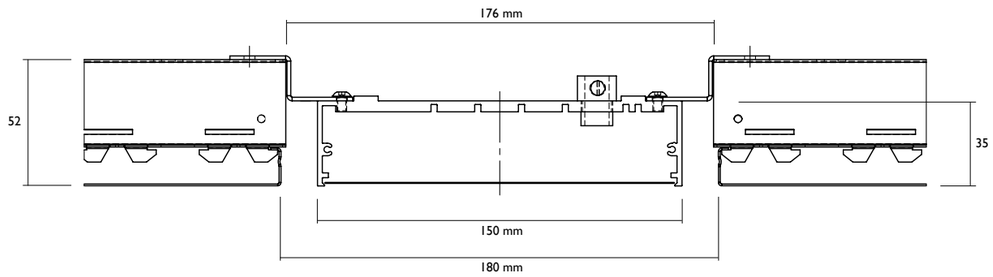


Light distribution curve micro prism



Light distribution curve opal

Construction and assembly measures



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

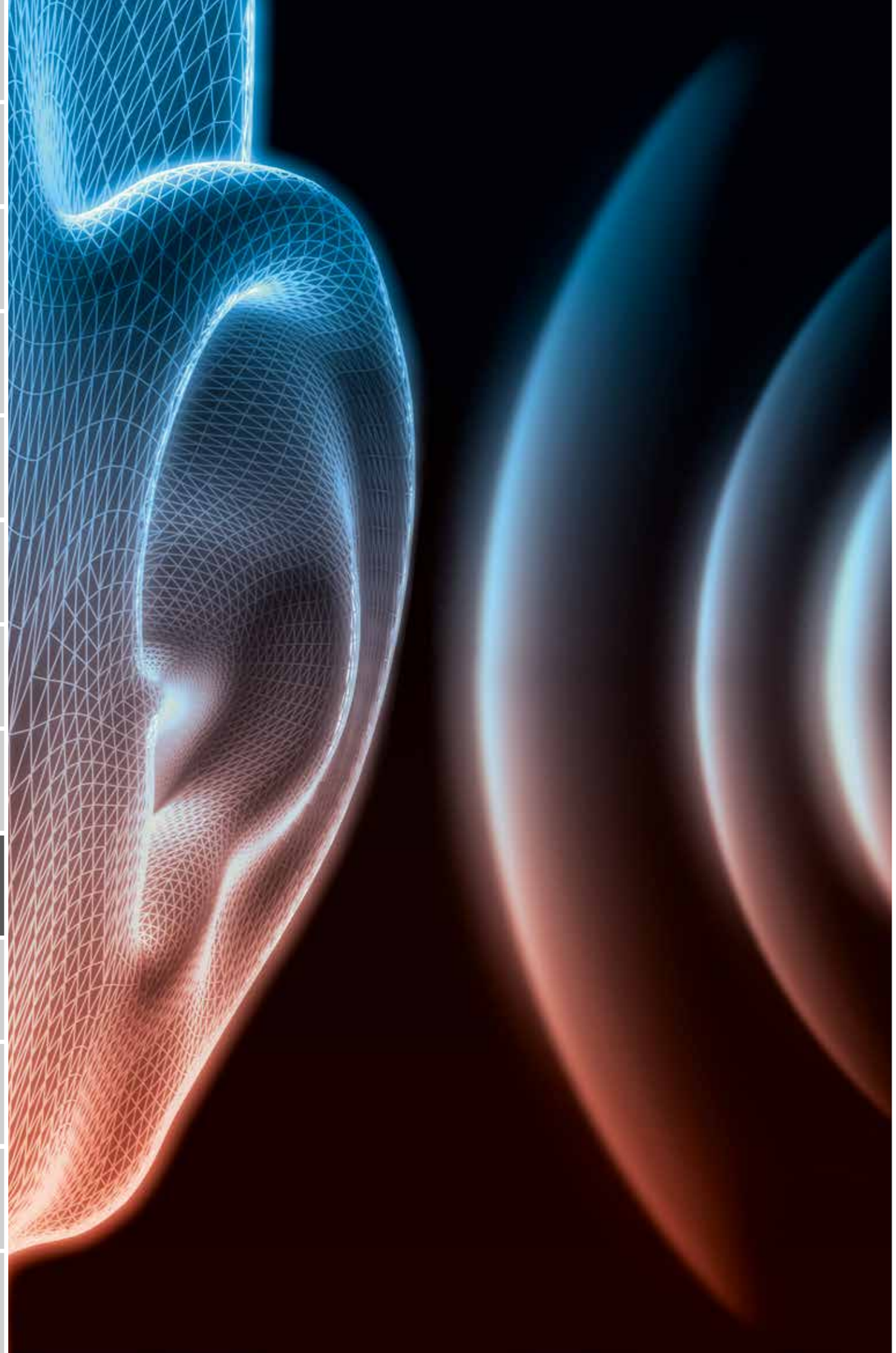
☐ Accessories
- ☐ Zone valve
- ☐ Automatic mass flow limiter

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

CLIMALINE Acoustical Effectivity (Sound Absorption)

Functional ceilings – thermally activated, acoustically effective

Planked Type A
D Gypsum
Gypsum Planked Type
Gypsum Tile Ceilings
Metal Tile Ceilings
Panel Ceiling Linear
Free Floating Ceiling Mono
Free Floating Ceiling Linear
Acoustical Effectivity
Cool Sets Water Chillers
Air Systems
Measurement & Contr. Techn.
Annex



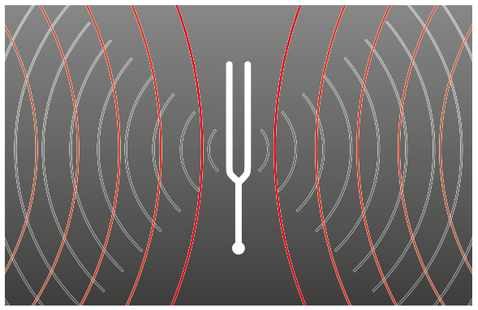
Explanation: Two Structural-Physical Basic Requirements

Thermal activation and reverberation time regulation – do they go hand in hand?

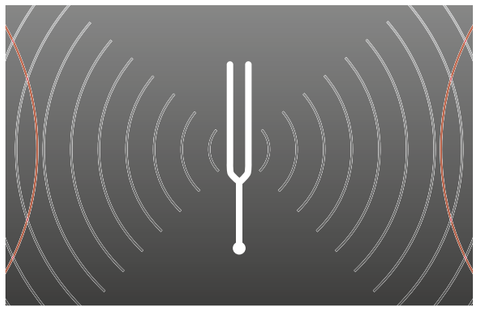
When describing suspended ceilings, we often talk about functional ceilings. This means that there are significantly different requirements for the component. Firstly, a suspended ceiling creates a revisable void, where different installations can be placed. Secondly, the ceiling also provides integration of various elements such as lighting, ventilation and speakers etc.

The term acoustic ceiling is also often used in this context. Largely based on this, we call a whole trade the acoustic construction trade. To plan and proceed successfully, in sum means nothing other than intelligently selecting the ratio of absorbing and reflective materials according to the purpose of the room.

The ceiling is often the largest or at least one of the largest absorption surfaces in a room. Sound absorption is achieved through perforated, slotted or grained surfaces, ensuring that the sound reaches the void where it can be absorbed. Usually, an absorbent matt is installed on the ceiling next to a frequently used acoustic fleece. The absorbing material on top mostly consists of mineral materials or melamine resin foam and also serves as trickle protection.



Long reverberation time: low absorption



Short reverberation time: high absorption

Now the specialist planners for building technology come along with their requirement to thermally activate the ceiling to the highest possible level. To comply with this request, heat conducting profiles are inserted in significant quantities in the ceiling. These profiles provide good lateral conduction of energy and the highest possible amount of energy is thus transported via the ceiling for heating and/or cooling.

Now, the favourite component of the acoustician has to do a balancing act, which is really not easy. The sum of the heat conducting sections blocks the route of the sound to the ceiling void. This leads to a severe distortion between reflective and absorbent areas. In order not to lose sight of both needs, but instead to intelligently combine them, this chapter lists some examples of the absorption ability of thermally highly activated CLIMALINE ceilings.

But since no construction project is like any other and no requirement can necessarily be transferred to the next site, CLIMALINE offers you open dialogue and then of course also a site-specific interpretation concerning these topics. Ask us!

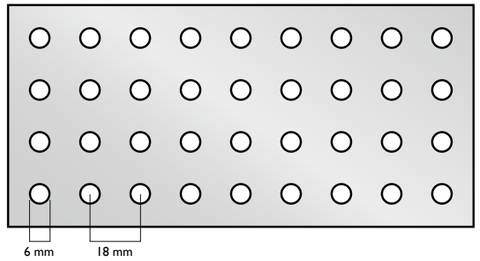
CLIMALINE Gypsum Planked Ceilings

The gypsum board industry provides quite standardized hole patterns, whose hole arrangements are either regular or irregular. It is also possible to order the gypsum panels in the slotted version. Each hole pattern measures a different free cross section. Of course this also changes the absorption of the entire ceiling. Other factors that affect the rate of reverberation time reduction via the ceiling are the suspension height, the type and thickness of the insulation and also of course, to a great extent, the number and arrangement of heat flux profiles in a thermally activated ceiling.

In principle, one can say:

- The more heat flux profiles there are, the higher the thermal performance
- The fewer heat flux profiles there are, the better the acoustic effectivity

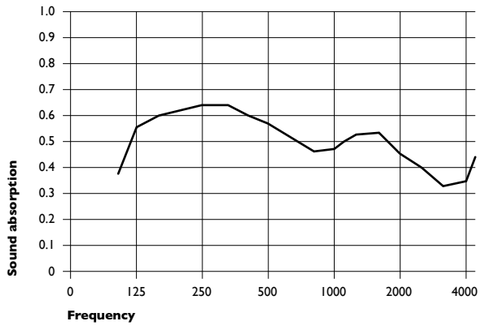
Because the sum of the changeable factors allows almost infinite combinations, this following chapter is limited to some examples that demonstrate the trends. We will be pleased to provide more detailed considerations in individual cases.

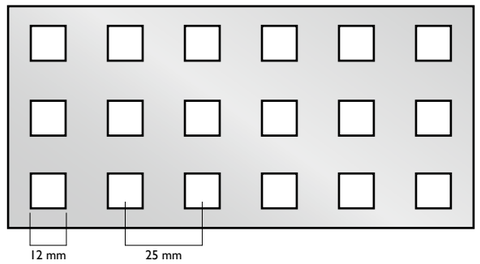


Perforation	R 6/18
Free cross section	8.7 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	20 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.50

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.50	0.65	0.55	0.50	0.45	0.35

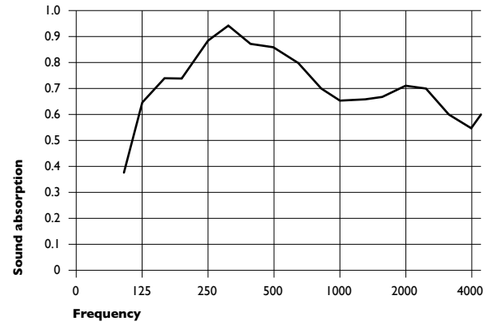




Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.60	0.85	0.85	0.70	0.70	0.60

Perforation	Q 12/25
Free cross section	23.0 %
Centre distance of HFP	200 mm
Suspension height	200 mm
Mineral insulation	20 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.70



CLIMALINE Expanded Glass Granulate Board

Whereas metal and gypsum-based surfaces necessarily require a perforation to be acoustically effective, other materials are themselves naturally absorbing.

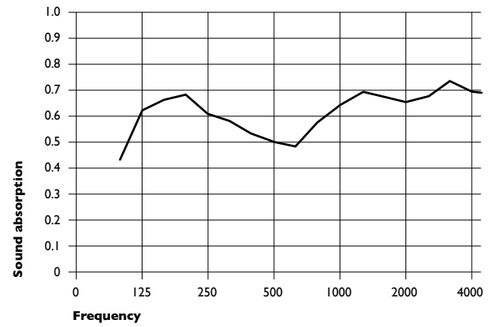
So, for example, expanded glass granulate is highly sound absorbing and can also serve as planking for CLIMALINE
Climaline systems. These 'FWA_cool' boards are modified with graphite, which leads to a significant improvement in conduction.

To achieve a monolithic surface in this application, the surface is finished after a special grouting with an acoustically transparent spray plaster.

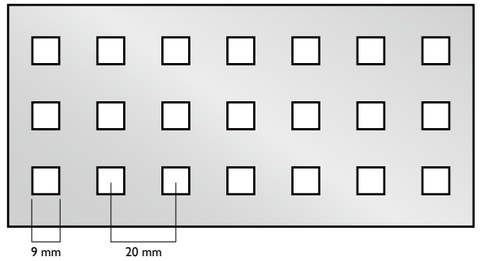
Surface	Monolithic
Centre distance of HFP	125 mm
Suspension height	200 mm
Mineral insulation	25 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.60

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.55	0.60	0.50	0.65	0.65	0.70



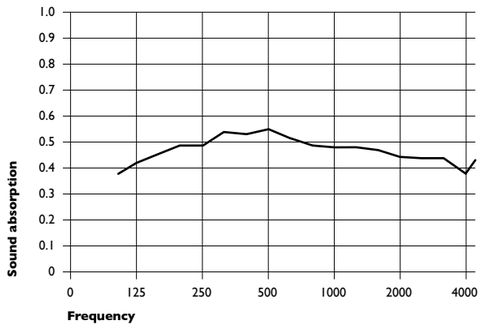
CLIMALINE Gypsum Tile Ceilings Thermo Panel 4T

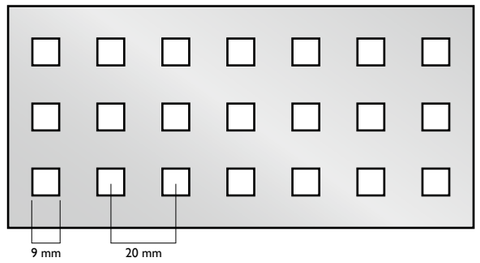


Perforation	Q 9/20
Free cross section	16.3 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	–
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.50

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.40	0.50	0.55	0.50	0.45	0.45

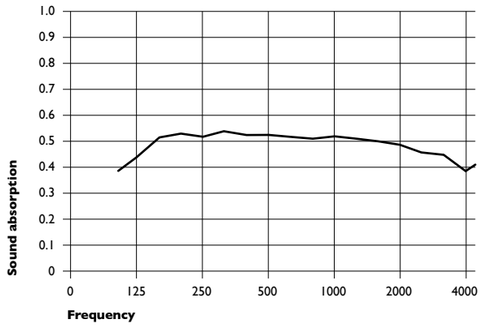


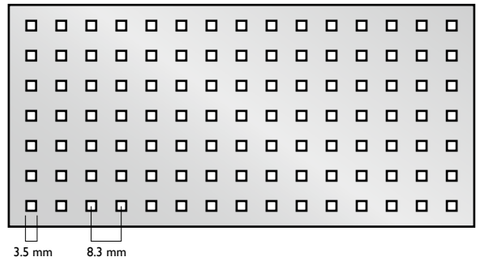


Perforation	Q 9/20
Free cross section	16.3 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	40 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.55

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.45	0.55	0.55	0.50	0.50	0.45

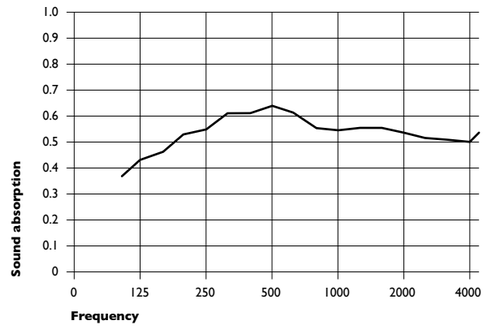


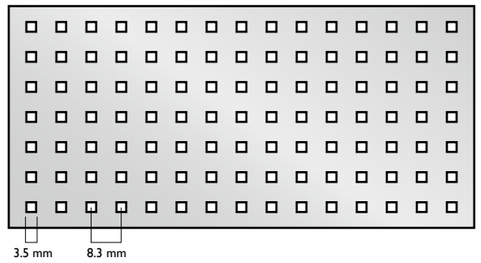


Perforation	Q 3.5/8.3
Free cross section	17.2 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	–
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.60

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.40	0.55	0.60	0.55	0.55	0.55

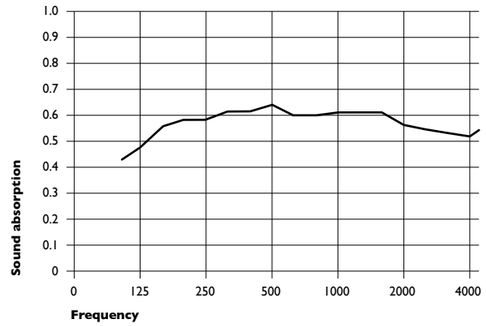


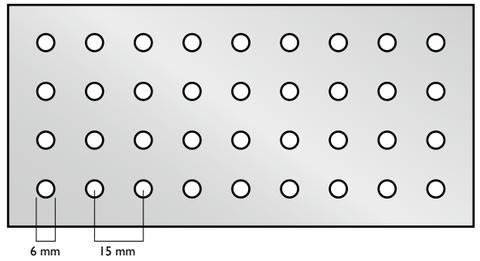


Perforation	Q 3.5/8.3
Free cross section	17.2 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	40 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.60

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.50	0.60	0.60	0.60	0.60	0.55

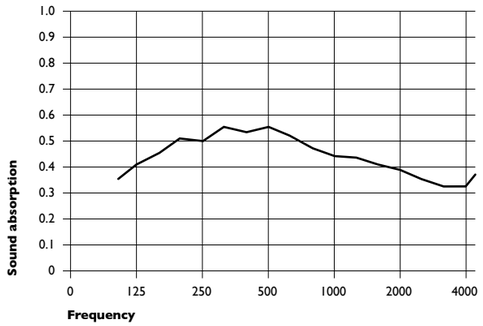


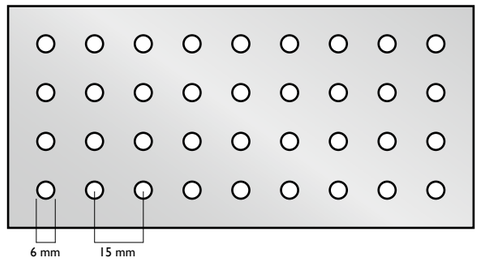


Perforation	R 6/15
Free cross section	10.6 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	–
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.45

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.40	0.50	0.55	0.45	0.40	0.35

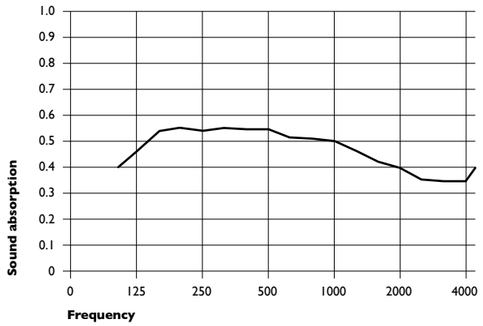


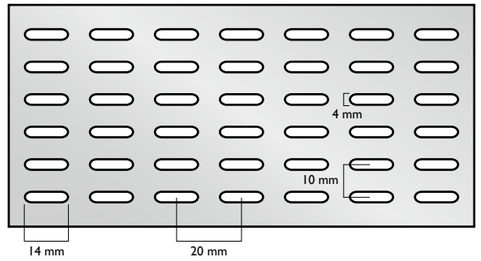


Perforation	R 6/15
Free cross section	10.6 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	40 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.50

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.45	0.55	0.55	0.50	0.40	0.40

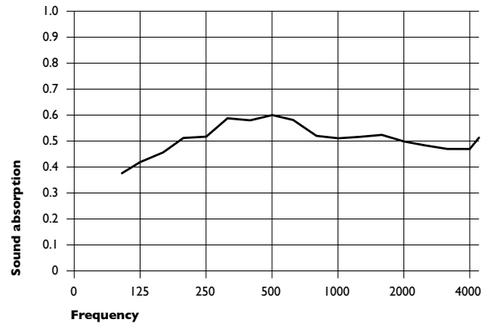


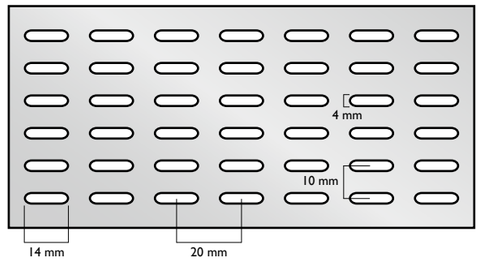


Perforation	T 14-4/20
Free cross section	21.1 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	–
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.55

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.40	0.55	0.60	0.50	0.50	0.50

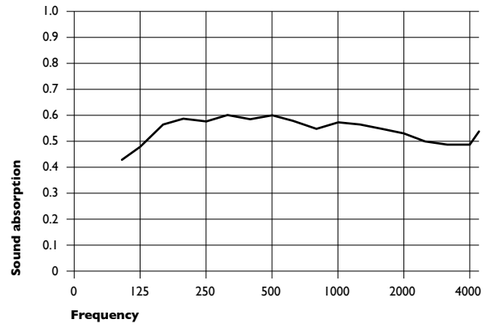




Perforation	T 14-4/20
Free cross section	21.1 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	40 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.60

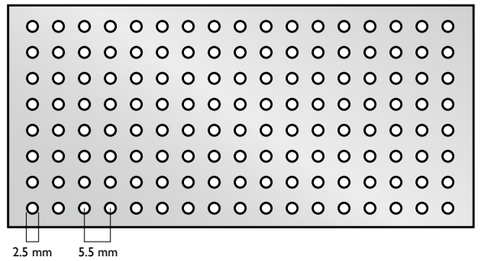
Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.50	0.60	0.60	0.55	0.55	0.50



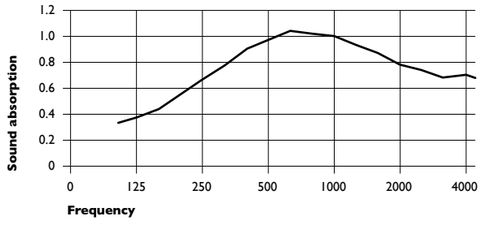
CLIMALINE Metal Tile Ceilings

It is not much different with metallic surfaces. Consideration should also be given here to the absorption performance which directly depends on the type of perforation, the arrangement of heat flux profiles, suspension height and of course the nature of the insulation used. Because of the material and its behaviour when processing, the perforations in metal tiles are generally much finer than in perforated gypsum boards without negatively changing the total free cross section.

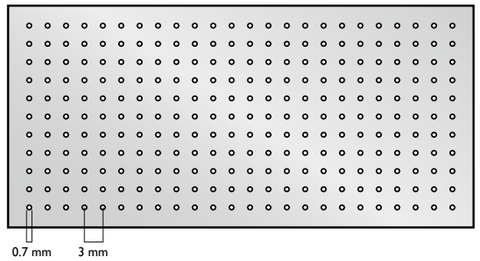


Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.48	0.95	0.92	0.94	0.79	0.73

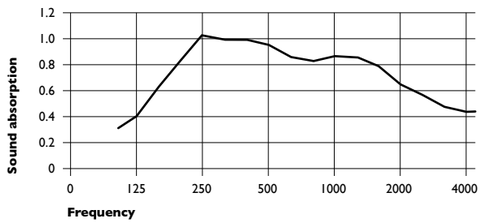


Perforation	R 25/16
Free cross section	16.0 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	40 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.85



Measuring results

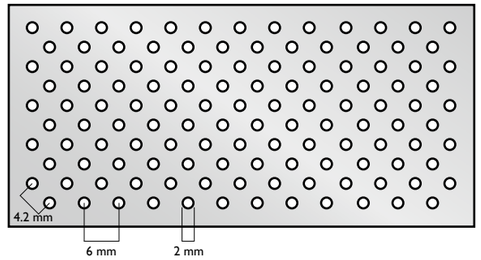
Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.30	1.00	0.95	0.86	0.63	0.43



Perforation	R 07/04
Free cross section	4.0 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	30 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.65

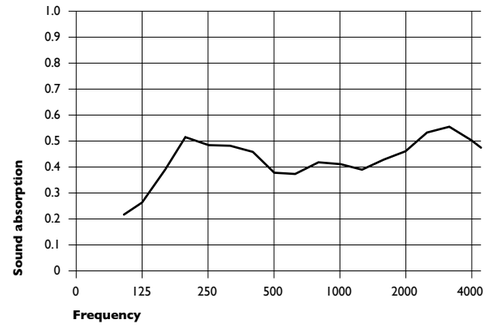
Planked Type A
D Gypsum
Gypsum Planked Type
Gypsum Tile Ceilings
Metal Tile Ceilings
Panel Ceiling Linear
Free Floating Ceiling Mono
Free Floating Ceiling Linear
Acoustical Effectivity
Cool Sets Water Chillers
Air Systems
Measurement & Contr. Techn.
Annex

CLIMALINE Panel Ceiling Linear



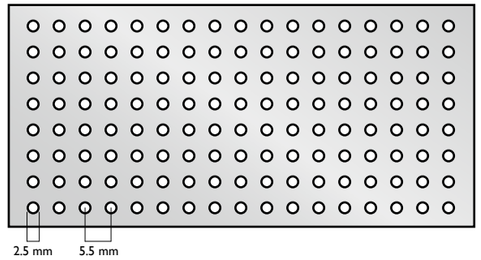
Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.26	0.48	0.38	0.40	0.46	0.50



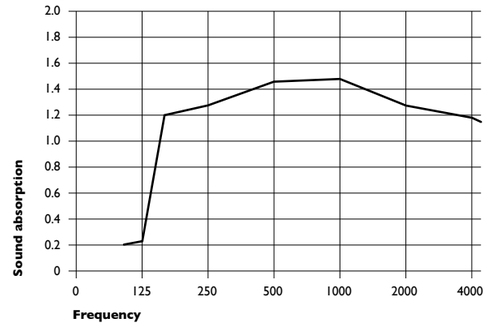
Perforation	R 2/18
Free cross section	18.0 %
Centre distance of HFP	150 mm
Suspension height	300 mm
Mineral insulation	20 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.45

CLIMALINE Free Floating Ceiling Mono



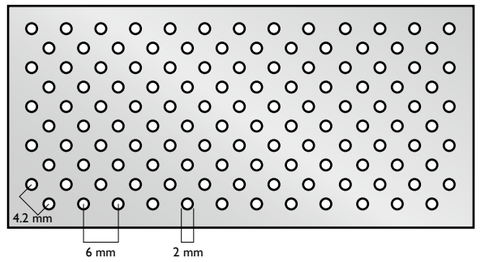
Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.23	1.27	1.46	1.48	1.27	1.19



Perforation	R 25/16
Free cross section	16.0 %
Centre distance of HFP	150 mm
Suspension height	200 mm
Mineral insulation	20 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 1.00

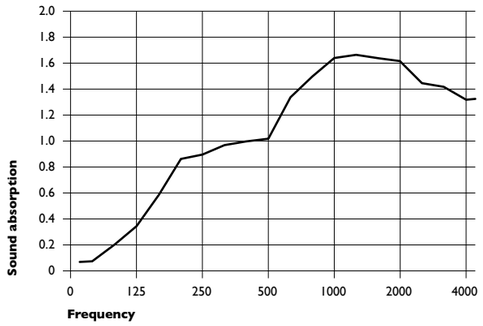
CLIMALINE Free Floating Ceiling Linear

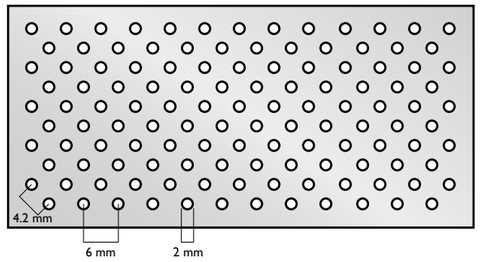


Perforation	R 2/18
Free cross section	18.0 %
Centre distance of HFP	90 mm
Suspension height	400 mm
Mineral insulation	50 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 1.00

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.35	0.90	1.02	1.64	1.62	1.32

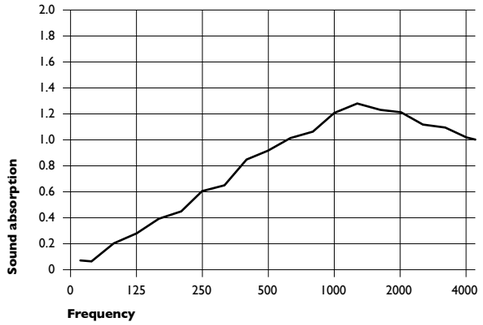




Perforation	R 2/18
Free cross section	18.0 %
Centre distance of HFP	90 mm
Suspension height	200 mm
Mineral insulation	20 mm
Weighted absorption factor acc. to DIN EN ISO 11654	αw-value: 0.85

Measuring results

Frequency f in Hz	125	250	500	1000	2000	4000
α_p	0.27	0.60	0.91	1.20	1.21	1.01



CLIMALINE Cool Sets – Water Chillers

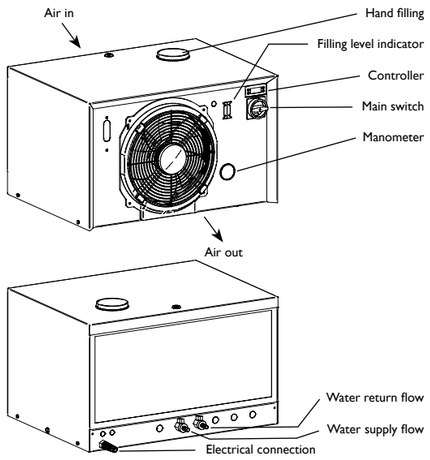
Compact cooling water re-circulating unit, plug-in, air-cooled

CLIMALINE Cool Sets MINI / MIDI / MAXI

The compact cooling water re-circulating units CLIMALINE Cool Set MINI, CLIMALINE Cool Set MIDI and CLIMALINE Cool Set MAXI are designed as plug-in, air-cooled devices.

Standard Equipment

- Water level indicator outside
- Evaporator made of copper
- State-of-the-art technology with economical and low noise compressors and ventilators
- Micro-Channel condenser; completely made of aluminium
- Temperature control by digital thermostat with temperature hysteresis ±1.0 K
- TÜV-certified high pressure limiter in the cooling circuit with expansion valve
- Metal filter cells in front of air inlet
- All standard devices permissible up to 42 °C ambient temperature
- Surge drum made of plastic
- Floating switch for protection against dry running of the pump
- Digital thermostat
- Environmentally friendly refrigerant R 407 C
- Bypass for pump protection
- Omnibus fault message, floating output
- Design according to ISO 9001 / EN 60204
- CE-conform
- Non-return valve and magnet valve



Options

- Manometer in the flow line
- Water connections 2 x supply and return flow
- Special voltages
- Flow monitor
- Automatic water supply
- Bypass valve
- Kit for roofed outdoor location (34 % added glycol required)

Technical Data CLIMALINE Cool Set MINI

For activated areas up to 40 m²

Operating points, relating to

Ambient temperature	32 °C
Water temperature	16 °C
Output	1360 W

General technical data

Refrigerant	R 407 C
Ambient temperature	min. 10 °C / max. 42 °C
Medium supply temperature	min. 10 °C / max. 25 °C
Evaporation material	copper
Temperature control	electronic, absolute run
Temperature indicator	digital
Control voltage	230 V AC
Connection voltage	1/N/PE/50 Hz, 230 V/± 10 %
Power input device	max. 1.40 kW
Power consumption device	max. 7.6 A
Max. pre-fuse	10.0 A
Noise level in 1 m	67 dB (A)
Paint cover hood	stainless steel
Paint base plate	RAL 9005
Length	710 mm
Width	545 mm
Height	450 mm
Net weight without filling	approx. 55 kg

Condenser

Condenser design	air cooled, axial
Number of fans	1 piece
Air performance	1290 m³/h
Nominal power per fan	0.07 kW
Nominal current per fan	0.32 A

Compressor

Compressor design	piston
Number of compressors	1 piece
Type of compressor start	direct
Nominal power compr.	max. 0.75 kW
Nominal current compr.	max. 3.50 A

Pump

Pump design	horizontal centrifugal pump
Pump type	Y 2051.0018
Number of pumps	1 piece
Nominal power pump	0.35 kW
Nominal current pump	3.50 A
Output pump	0.26 m³/h
Delivery height pump	3.6 bar

Tank

Water tank design	plastic
Water tank capacity	20 l
Connections supply/return flow	½ inches
Art. no.	216472

The information stated is based on the current technical knowledge and experiences of the manufacturer. Due to the many possible influences during use or installation of these products, this information does not release the installer from his duty to always check the products for their suitability for the specific intended purpose.

Technical Data CLIMALINE Cool Set MIDI

For activated areas up to 60 m²

Operating points, relating to

Ambient temperature	32 °C
Water temperature	16 °C
Output	2520 W

General technical data

Refrigerant	R 407 C
Ambient temperature	min. 10 °C / max. 42 °C
Medium supply temperature	min. 10 °C / max. 25 °C
Evaporation material	copper
Temperature control	electronic, absolute run
Temperature indicator	digital
Control voltage	230 V AC
Connection voltage	1/N/PE/50 Hz, 230 V/± 10 %
Power input device	max. 1.80 kW
Power consumption device	max. 10.0 A
Max. pre-fuse	16.0 A
Noise level in 1 m	67 dB (A)
Paint cover hood	stainless steel
Paint base plate	RAL 9005
Length	710 mm
Width	545 mm
Height	450 mm
Net weight without filling	approx. 81 kg

Condenser

Condenser design	air cooled, axial
Number of fans	1 piece
Air performance	1020 m³
Nominal power per fan	0.07 kW
Nominal current per fan	0.32 A

Compressor

Compressor design	piston
Number of compressors	1 piece
Type of compressor start	direct
Nominal power compr.	max. 1.17 kW
Nominal current compr.	max. 5.90 A

Pump

Pump design	horizontal centrifugal pump
Pump type	Y 2051.0018
Number of pumps	1 piece
Nominal power pump	0.35 kW
Nominal current pump	3.50 A
Output pump	0.43 m³/h
Delivery height pump	2.9 bar

Tank

Water tank design	plastic
Water tank capacity	20 l
Connections supply/return flow	½ inches
Art. no.	216473

The information stated is based on the current technical knowledge and experiences of the manufacturer. Due to the many possible influences during use or installation of these products, this information does not release the installer from his duty to always check the products for their suitability for the specific intended purpose.

Technical Data CLIMALINE Cool Set MAXI

For activated areas up to 120 m²

Operating points, relating to

Ambient temperature	32 °C
Water temperature	16 °C
Output	4715 W

General technical data

Refrigerant	R 407 C	Power input device	max. 2.70 kW
Ambient temperature	min. 10 °C / max. 42 °C	Power consumption device	max. 11.3 A
Medium supply temperature	min. 10 °C / max. 25 °C	Max. pre-fuse	16.0 A
Evaporation material	copper	Noise level in 1 m	68 dB (A)
Temperature control	electronic, absolute run	Paint cover hood	stainless steel
		Paint base plate	RAL 9005
Temperature indicator	digital	Length	760 mm
Control voltage	230 V AC	Width	610 mm
Connection voltage	1/N/PE/50 Hz, 230 V/± 10 %	Height	500 mm
		Net weight without filling	approx. 81 kg

Condenser

Condenser design	air cooled, axial
Number of fans	1 piece
Air performance	1350 m³
Nominal power per fan	0.07 kW
Nominal current per fan	0.32 A

Compressor

Compressor design	piston
Number of compressors	1 piece
Type of compressor start	direct
Nominal power compr.	max. 1.88 kW
Nominal current compr.	max. 7.60 A

Pump

Pump design	horizontal centrifugal pump
Pump type	CM 3-4
Number of pumps	1 piece
Nominal power pump	0.50 kW
Nominal current pump	3.10 A
Output pump	1.30 m³/h
Delivery height pump	2.1 bar

Tank

Water tank design	plastic
Water tank capacity	26 l
Connections supply/return flow	½ inches

Art. no. 216474

The information stated is based on the current technical knowledge and experiences of the manufacturer. Due to the many possible influences during use or installation of these products, this information does not release the installer from his duty to always check the products for their suitability for the specific intended purpose.

CLIMALINE Cool Set GIGA

The CLIMALINE Cool Set GIGA compact cooling water re-circulating unit is designed as a high-voltage plug-in, air-cooled device.

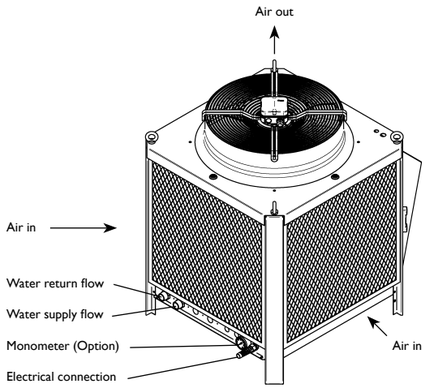
Suitable for outdoor installation!

Equipment

- Compact plug-in device
- Economical, quiet scroll-compressor
- Frame construction made of stainless steel
- Pipe coil condenser made of copper
- Externally mounted control box (+105 mm)
- High and low pressure control
- Omnibus fault message, floating potential-free at terminal
- All motors minimum protection class IP 54
- CE-conform
- Design according to DIN EN ISO 9001-200
- Micro-channel condenser; made completely of aluminium
- Especially environmental friendly: 60 % less refrigerant
- Non-return valve and magnet valve
- Kit for outdoor installation (34 % added glycol required)

Options

- Speed controlled compressor, fan or pump
- DC control voltage
- Special voltages
- Increased fans for external air compression
- Harting and Wieland plug-in connectors
- Low temperature hysteresis
- Difference based control technique
- Water cooled condenser
- Reinforced pump
- and more



Technical Data CLIMALINE Cool Set GIGA

For activated areas up to 250 m²

Operating points, relating to

Ambient temperature	32 °C
Water temperature	16 °C
Output	10700 W

General technical data

Refrigerant	R 410 A	Power input device	max. 6.20 kW
Ambient temperature	min. – 20 °C / max. 42 °C	Power consumption device	max. 11.1 A
Medium supply temperature	min. 16 °C / max. 40 °C	Max. pre-fuse	16.0 A
Evaporation material	copper	Noise level in 1 m	71 dB (A)
Temperature control	electronic, absolute run	Device colour	RAL 7035
		Length	715 mm
Temperature indicator	digital	Width	715 mm
Control voltage	24 V AC	Height	927 mm
Connection voltage	3/PE/50 Hz, 400 V/± 10 %	Net weight without filling	approx. 150 kg

Condenser

Condenser design	air cooled, axial
Number of fans	1 piece
Air performance	max. 4300 m³/h
Nominal power per fan	0.71 kW
Nominal current per fan	1.40 A

Compressor

Compressor design	fully hermetic scroll-compressor
Number of compressors	1 piece
Type of compressor start	direct
Nominal power compr.	max. 4.80 kW
Nominal current compr.	max. 8.20 A

Pump

Pump design	horizontal centrifugal pump
Pump type	CM 3-4
Number of pumps	1 piece
Nominal power pump	0.46 kW
Nominal current pump	1.20 A
Output pump	2.0 m³/h
Delivery height pump	3.2 bar

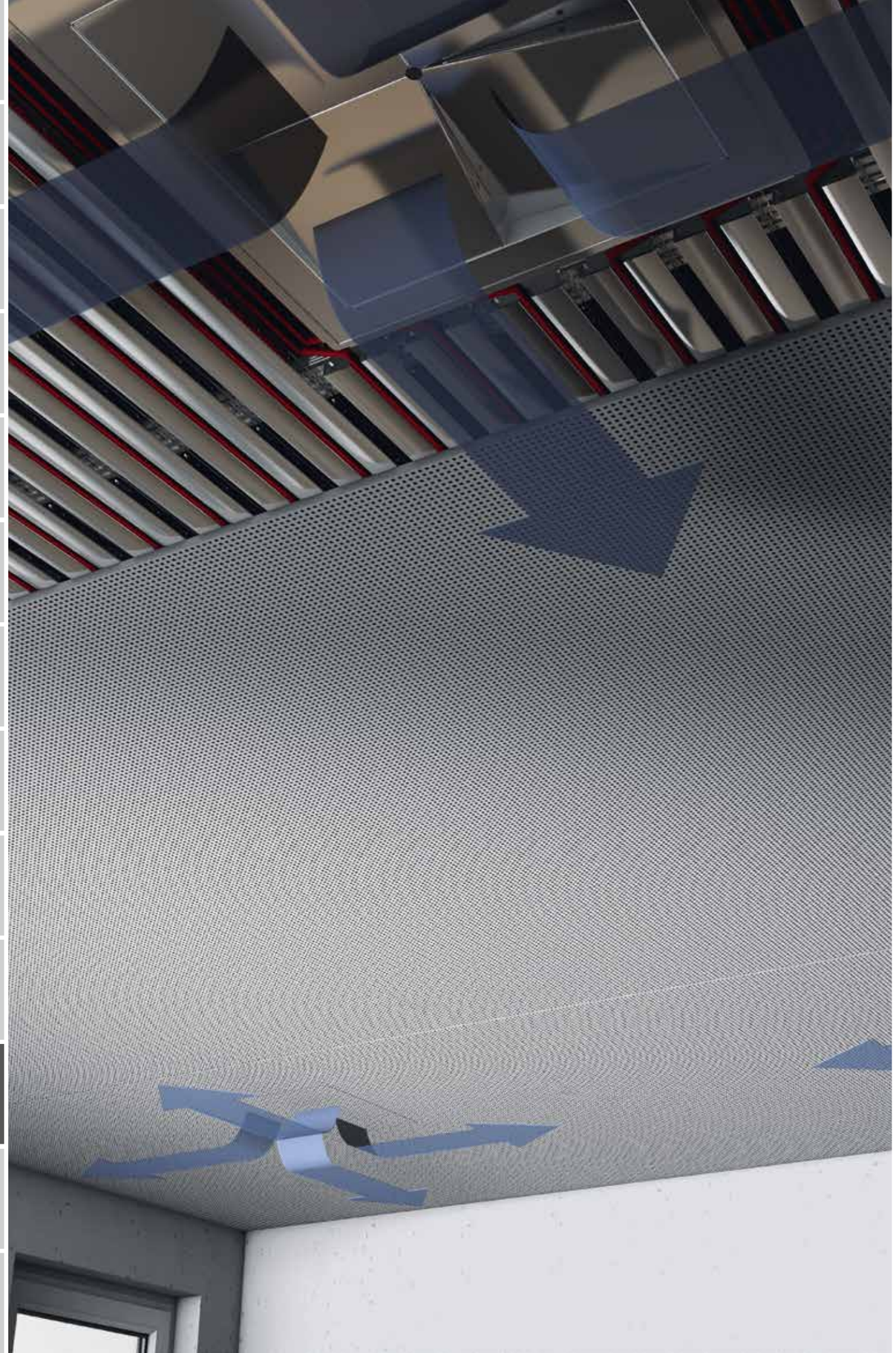
Tank

Water tank design	plastic
Water tank capacity	26 l
Connections supply/return flow	¾ inches
Art. no.	216475

The information stated is based on the current technical knowledge and experiences of the manufacturer. Due to the many possible influences during use or installation of these products, this information does not release the installer from his duty to always check the products for their suitability for the specific intended purpose.

CLIMALINE Air Systems

Ventilation systems for thermally activated ceilings



CLIMALINE AirFrame

The smart combination of efficient ventilation and a thermally activated ceiling in the planning of climatic well working rooms is state of the art since long. To integrate the controlled air supply optical harmonic into the Climaline gypsum ceilings, there is the CLIMALINE AirFrame. It is mounted like an inspection hatch almost invisible in the ceiling. However conventional grills always are dominantly visible, the AirFrame guarantees through the ceiling an effective ventilation without draft. Due to the innovative fluid mechanics an optimal stream along the ceiling with even temperature distribution and with this a comfortable room climate is achieved.

Product Advantages

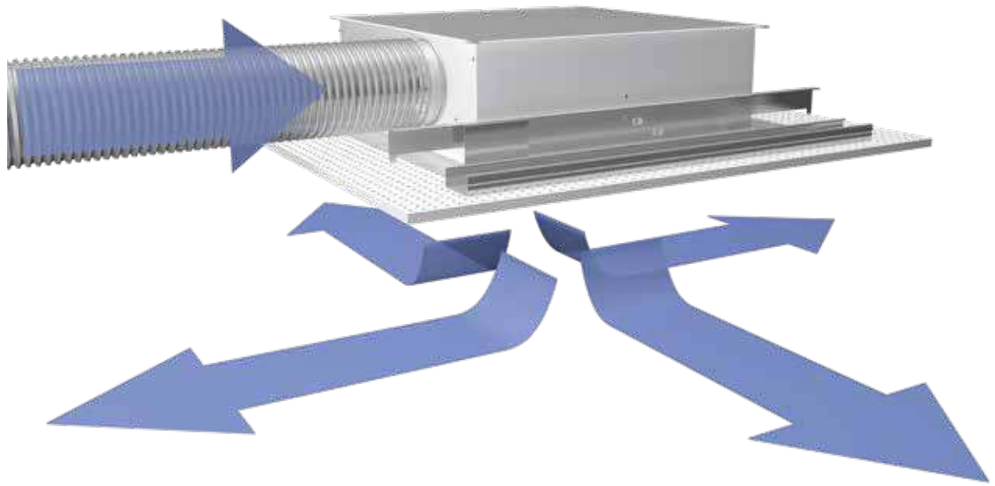
Mounting like an inspection hatch
Very little panel thickness
Smooth integration into the gypsum ceiling
Horizontal air distribution
Air supply with high comfort without draft

Areas of Application

Office buildings
Hospitals
Open-plan offices
Foyers
Ambulant clinics

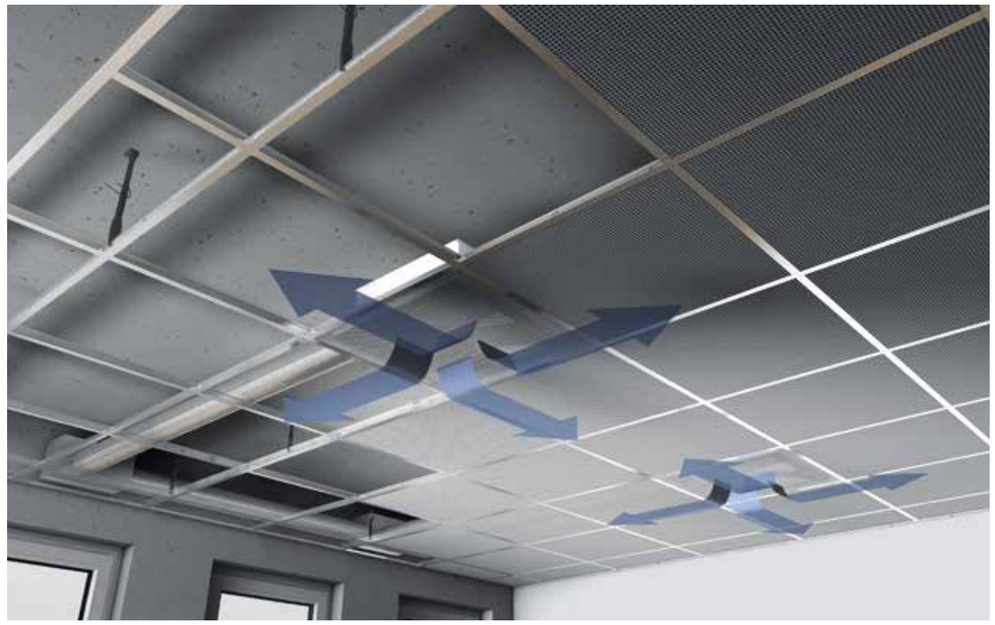
Technical Data

System suitability	Gypsum Planked Type A | Thermo Panel 4T
Amount of air	120 – 260 m^3/h
Air distribution	360°
Dimension	601 x 601 mm
Thickness	210 mm
Weight	8.7 kg



Ceiling System Gypsum Planked Type A with Climaline Air-

Gypsum Tile Ceiling Thermo Panel 4T with Climaline Air-

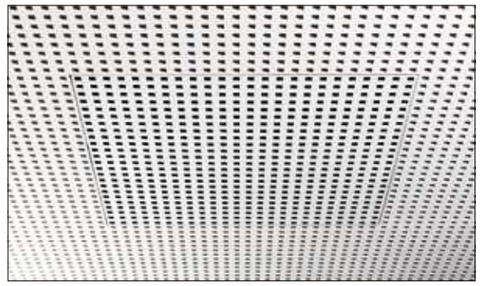


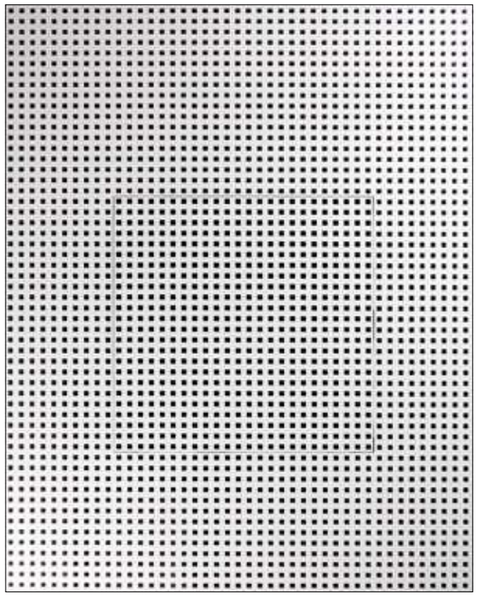
Assembly of the Ventilation Unit

The ventilation unit is simply laid into the frame. During the assembly the air supply hose is plugged onto the element (see picture no. 5).

Detail Sights

The whole technique is placed in the void, fully integrated into the substructure of the ceiling. Only a 2 mm thin gap around the inspection hatch remains in the gypsum ceiling.

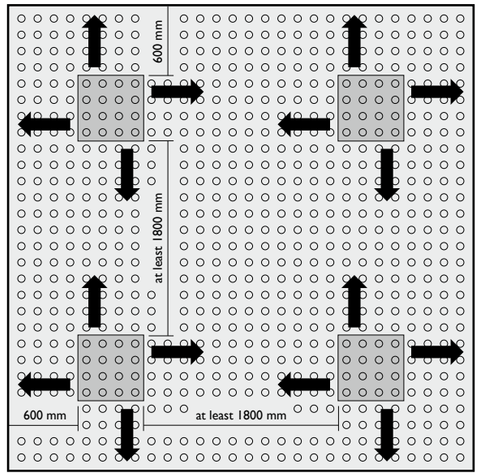




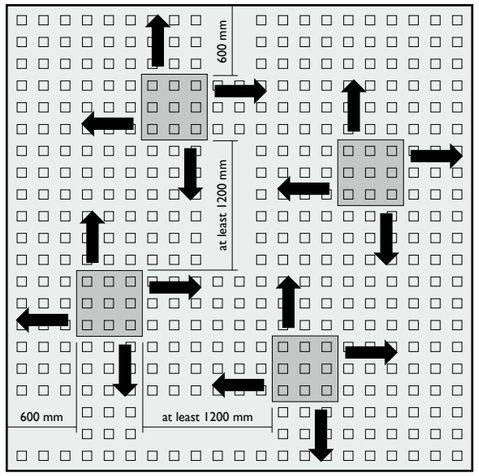
Construction

Formation of the AirFrames

The number of the AirFrames depends on the size of the room and of course on the amount of air required. For the either linear or offset mounting different measures and distances got to be considered.



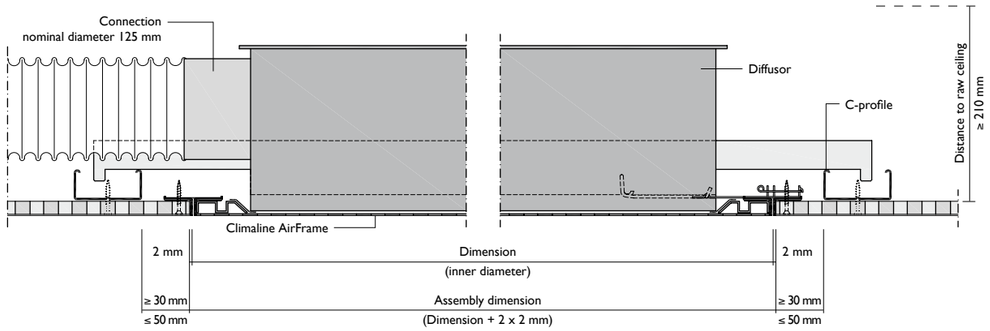
Linear formation



Offset formation

Construction and assembly measures

Due to its little panel thickness the CLIMALINE AirFrame can be integrated into the suspended ceiling very space-savingly.



CLIMALINE AirFlow

The CLIMALINE AirFlow is an optimal addition to the Climaline cooling ceilings. In rooms, where by reason of the use, the quality of the building envelope or the geographic position the determined sensitive cooling loads cannot be achieved, the AirFlow supports then. Technically considered the AirFlow is a fan coil. The device consists of a convector and an inductive slit outlet and is a silent and optically pleasant system solution for the thermal peaks. The Climaline Airflow has the function to bring air into the room as effective as possible without producing an uncomfortable draft.

Product Advantages

Easy assembly
Clear separation of drylining and HVAC
Same system temperatures as the chilled ceiling
High thermal comfort due to 3D-distribution
Low operating costs
Easy maintenance through slit outlet

Areas of Application

Meeting rooms
Corner offices
Open-plan offices
Foyers
Rooms with high internal cooling loads

Technical Data

Construction size	**Type 60**	**Type 80**	**Type 100**
System suitability	Gypsum Planked Type A	Gypsum Planked Type A	Gypsum Planked Type A
Operational weight	20 kg	25 kg	30 kg
Construction height	294 mm	294 mm	294 mm
Unit width	337 mm	337 mm	337 mm
Unit length	994 mm	1194 mm	1394 mm
Size of the visible diffusor	129 x 1000 mm	129 x 1200 mm	129 x 1400 mm
Water content	0.9 l	1.2 l	1.5 l
Power supply	< 20 W	< 20 W	< 20 W

Design CLIMALINE AirFlow Type 60

The below mentioned lists picture the performance data of the AirFlow devices under non-condensing operation. In the tables you find a few examples with system temperatures recommended by us.

Cooling **System: CLIMALINE AirFlow Type 60**

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	724.9 W	693.0 W	602.8 W	656.7 W	616.0 W	511.5 W
Mass flow	281 kg/h	179 kg/h	117 kg/h	256 kg/h	160 kg/h	100 kg/h
Pressure loss	520 mbar	230 mbar	110 mbar	440 mbar	190 mbar	80 mbar
L_P (at 6 dB sound absorption)	40 dB(A)	40 dB(A)	40 dB(A)	40 dB(A)	40 dB(A)	40 dB(A)

Cooling **System: CLIMALINE AirFlow Type 60**

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	564.3 W	561.0 W	436.7 W	514.8 W	459.8 W	370.7 W
Mass flow	220 kg/h	201 kg/h	85 kg/h	200 kg/h	119 kg/h	72 kg/h
Pressure loss	330 mbar	130 mbar	60 mbar	330 mbar	110 mbar	50 mbar
L_P (at 6 dB sound absorption)	35 dB(A)	35 dB(A)	35 dB(A)	35 dB(A)	35 dB(A)	35 dB(A)

Because of the cold air which is led along the surface of the thermally activated ceiling, enforced convection is generated which naturally leads to an improvement in performance. This additional convection performance is already considered in the calculations with 10 %.

According to VDI 2569 a sound pressure of 40 dB(A) is absolutely permissable.

Design CLIMALINE AirFlow Type 80

The below mentioned lists picture the performance data of the AirFlow devices under non-condensing operation. In the tables you find a few examples with system temperatures recommended by us.

Cooling **System: CLIMALINE AirFlow Type 80**

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	1036.2 W	936.1 W	910.8 W	949.3 W	854.7 W	812.9 W
Mass flow	359 kg/h	243 kg/h	177 kg/h	359 kg/h	222 kg/h	158 kg/h
Pressure loss	1020 mbar	510 mbar	290 mbar	1020 mbar	430 mbar	230 mbar
L_P (at 6 dB sound absorption)	40 dB(A)	40 dB(A)	40 dB(A)	40 dB(A)	40 dB(A)	40 dB(A)

Cooling **System: CLIMALINE AirFlow Type 80**

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	743.6 W	729.3 W	680.9 W	676.5 W	660.0 W	599.5 W
Mass flow	288 kg/h	189 kg/h	133 kg/h	263 kg/h	172 kg/h	117 kg/h
Pressure loss	690 mbar	320 mbar	170 mbar	580 mbar	270 mbar	140 mbar
L_P (at 6 dB sound absorption)	35 dB(A)	35 dB(A)	35 dB(A)	35 dB(A)	35 dB(A)	35 dB(A)

Because of the cold air which is led along the surface of the thermally activated ceiling, enforced convection is generated which naturally leads to an improvement in performance. This additional convection performance is already considered in the calculations with 10 %.

According to VDI 2569 a sound pressure of 40 dB(A) is absolutely permissable.

Design CLIMALINE AirFlow Type 100

The below mentioned lists picture the performance data of the AirFlow devices under non-condensing operation. In the tables you find a few examples with system temperatures recommended by us.

Cooling **System: CLIMALINE AirFlow Type 100**

System temperature						
Supply temperature	15 °C	15 °C	15 °C	16 °C	16 °C	16 °C
Return temperature	17.6 °C	18 °C	19 °C	18.4 °C	19 °C	20 °C
Room temperature	26 °C	26 °C	26 °C	26 °C	26 °C	26 °C
Cooling output	1215.5 W	1122.0 W	1103.3 W	1113.2 W	1019.7 W	1002.1 W
Mass flow	359 kg/h	291 kg/h	214 kg/h	359 kg/h	265 kg/h	195 kg/h
Pressure loss	1180 mbar	810 mbar	3470 mbar	1180 mbar	690 mbar	400 mbar
L_P (at 6 dB sound absorption)	40 dB(A)	40 dB(A)	40 dB(A)	40 dB(A)	40 dB(A)	40 dB(A)

Cooling **System: CLIMALINE AirFlow Type 100**

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	932.8 W	872.3 W	851.4 W	816.2 W	797.5 W	764.5 W
Mass flow	349 kg/h	226 kg/h	166 kg/h	318 kg/h	207 kg/h	149 kg/h
Pressure loss	1130 mbar	450 mbar	300 mbar	950 mbar	380 mbar	240 mbar
L_P (at 6 dB sound absorption)	35 dB(A)	35 dB(A)	35 dB(A)	35 dB(A)	35 dB(A)	35 dB(A)

Because of the cold air which is led along the surface of the thermally activated ceiling, enforced convection is generated which naturally leads to an improvement in performance. This additional convection performance is already considered in the calculations with 10 %.

According to VDI 2569 a sound pressure of 40 dB(A) is absolutely permissable.

CLIMALINE Measurement and Control Technology

Measuring, controlling, operating

Product Advantages

Simple handling and assembly
All-purpose for all Climaline ceiling systems
Available in almost all switch programs
Integrated dew point monitoring
Heating and cooling control for 2- and 4-pipe systems

Areas of Application

Residential and commercial spaces
Hotels
Public spaces
Canteens
Training and seminar rooms

Delivery Programme Overview

CLIMALINE Room Controller			Art. no.	Page
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	Room Controller Object for CLIMALINE Ceiling Systems		231164	133

CLIMALINE Room Controller Radio Transmitter			Art. no.	Page
	Room Controller Comfort Radio for CLIMALINE Ceiling Systems		231059	134
	Room Controller Object Radio for CLIMALINE Ceiling Systems		319620	135

CLIMALINE Room Controller Radio Receiver			Art. no.	Page
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	Room Controller Receiver 1-channel for CLIMALINE Ceiling Systems		231056	138

CLIMALINE Dew Point Measurement			Art. no.	Page
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CLIMALINE Accessories			Art. no.	Page
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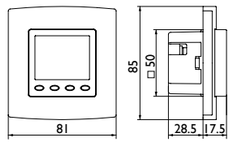
	OPTIMA Compact Pressure-Independent Balancing and Control Valve for CLIMALINE Ceiling Systems		on request	143

Room Controller Comfort for CLIMALINE Ceiling Systems – Flush-Mounted



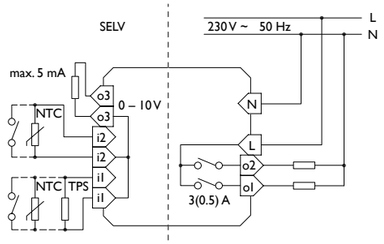
The watch can be used as master for other controllers or for ECO-shift. With an external contact the power save function (ECO) or the antifreeze protection (OFF) can be activated.

As an alternative the inputs of the controller can be configured for an external temperature sensor or dew point sensor (TPS). Via a 0 – 10 V interface a fan can be speed-controlled.

Electronic room controller with watch, flush-mounted controller for time-independent cooling and heating, for 2- and 4-pipe systems in hotels, residential and business buildings. The adjustment is carried out in the menu.

Up to five valve actuators (currentless open or closed) can be controlled per outlet. In 2-pipe mode the operating mode can be switched via an external contact (change-over) or a temperature sensor.

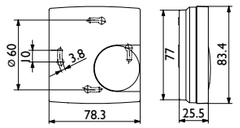
Connection



Technical Data

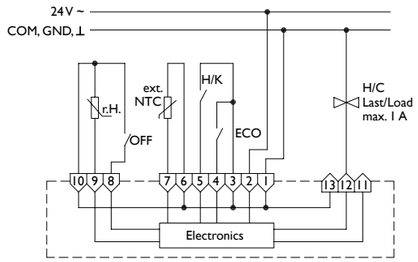
Operating voltage	230 V ~, 50 Hz	Colour case	pure white, sim. to RAL 9010
Sensor	internal NTC 47 kΩ, external NTC 47 kΩ,TPS	Material case	PC, PMMA, ABS
		Mounting/Fixing	flush-mounted socket, available in nearly all switch programs
Switching capacity	per 3 (0.5) A / 230 V ~		
Switch contact	2 relays/closing contacts		
Setting range	5 to 30 °C heating, 18 to 40 °C cooling	Electric connections	screw-clips
		Inlet 1	ext. sensor NTC 47 kΩ, ECO/OFF/TPS
Switching differential	< 1 K		
Display	illuminated, graphic display	Inlet 2	CO-contact/ CO-sensor in 2-pipe, ECO/OFF in 4-pipe
Protection type	IP 30		
Protection class	II, after appropriate mounting		
Power reserve watch	approx. 3 days	Outlet 1	heating (4-pipe), heating/cooling in 2-pipe
Admissible humidity	max. 95 % r.H., non-condensing	Outlet 2	cooling (4-pipe)/watch
		Outlet 3	fan control
Storage temperature	– 20 to + 70 °C		0 to 10 V =, max. 5 mA
Safety and EMC	according to DIN EN 60730	Art. no.	231163
Ambient temperature	0 to 35 °C		

Room Controller Object for CLIMALINE Ceiling Systems – Surface-Mounted

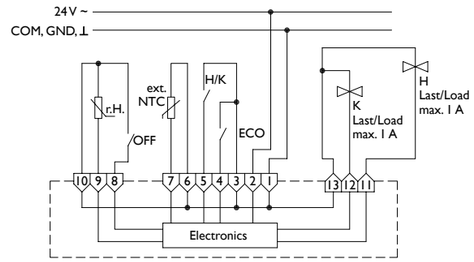


This controller has been developed especially for heating/cooling regulation on 2- and 4-pipe systems in hotels, commercial and residential buildings. It is able to control up to 5 valve actuators (24 V ~, currentless closed or open) per outlet. The controller includes the dew point control function for the cooling ceiling.

Connection in the 2-pipe system



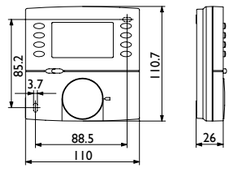
Connection in the 4-pipe system



Technical Data

Operating voltage	24 V ~, 50/60 Hz, safety extra-low voltage	– yellow in setting OFF:	antifreeze protection on
		– green:	interruption of cooling because of condensate
Sensor	NTC 47 kΩ internal and/or external, external supply flow sensor	– flashing red:	error of external sensor, controlling now via internal sensor
	NTC 47 kΩ (change-over-sensor), external TPS	Protection type	IP 30, after appropriate mounting
Switching current	1 A / 24 V ~ (max. 5 electro-thermic valves each outlet)	Protection class	III
		Admissible humidity	max. 95 % r.H., non-condensing
Switch contact	2 relays/closing contacts		
Setting range	21 °C ± 8 K (mark red/blue)	Storage temperature	– 20 to + 70 °C
		Safety and EMC	according to DIN EN 60730
Switching differential	heating/cooling: < 1 K	Ambient temperature	0 to 40 °C
Neutral zone	approx. 2 K fixed	Colour case	pure white, sim. to RAL 9010
ECO-zone	± 3 K set	Material case	plastic ABS
Displays (LED)		Mounting/fixing	surface-mounted
– yellow:	heating	Art. no.	231164
– blue:	cooling		

Room Controller Comfort Radio for CLIMALINE Ceiling Systems – Surface-Mounted



Radio-room temperature sensor with temperature measurement for residential, office and hotel spaces with usual degree of pollution. When used together with CLIMALINE radio receivers, a single room temperature control is realised.

Application mostly in renovation projects or extensions of existing buildings. Costly brick- and plasterwork for buried wiring can be avoided.

Particularly suitable for office floors where the flexibility of the floor plan is paramount.

Temperature sensor (transmitter) for temperature measuring and radio transmission to the controller (receiver), incl. watch.

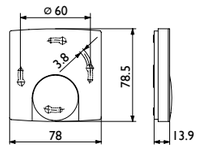
Simple handling because of directly accessible push-buttons for ON/OFF, holiday setting, party setting, operating mode and information retrieval for displaying all settings. Either heating, cooling or heating and cooling mode can be selected. Separate watch setting for cooling mode, temperature setting button with °C-scale.

Display of temperature and time, automatic adjustment of summer and winter time, child-proof lock, valve protection (factory setting: OFF) and self-learning mode (can be activated for heating), case "Berlin 3000", master for master-slave-mode, background lighting (third separate battery only for background lighting, advantage: control function is ensured even in case of empty lighting battery), preset week program (Mon – Fri 05.00 a.m. – 09.00 a.m., 04.00 p.m. – 10.00 p.m. / Sat, Sun 06.00 a.m. – 10.00 p.m., Comfort mode)

Technical Data

Operating voltage	3 pieces battery Micro AAA, 1.5 V / 1100 mAh	Equipment	mechanical range restriction
Sensor	NTC internal	Admissible humidity	max. 95 % r.H., non-condensing
Setting range	5 to 30 °C	Storage temperature	– 10 to + 50 °C
Lowering	adjustable	Safety and EMC	according to DIN EN 60950-1 and DIN EN 300220
Transmitting frequency	868.3 MHz		
Transmitting interval	approx. 3 min and after nominal value change	Ambient temperature	– 10 to + 50 °C
Range	150 m line-of-sight, up to 30 m in buildings (depending on construction)	Colour case	pure white, sim. to RAL 9010
		Material case	plastic ABS
LED	learning mode, battery empty status display	Mounting/fixing	direct surface or wall mounted for instance with screws or adhesive strip
Protection type	IP 30		
Protection class	III	Art. no.	231059

Room Controller Object Radio for CLIMALINE Ceiling Systems – Surface-Mounted



Radio-room controller with temperature sensor for hotels, residential and commercial buildings with usual degree of pollution.

In combination with CLIMALINE radio receivers, a single room temperature control is realised.

Application mostly in renovation projects or extensions of existing heating systems. Costly brick- and plasterwork for buried wiring can be avoided. Especially suitable for office floors where the flexibility of the floor plan is paramount.

Temperature sensor (transmitter) for temperature measuring and radio transmission to the controller (receiver).

Including setpoint value adjuster.

Technical Data

Operating voltage	2 pieces battery Micro AAA, 1.5 V / 1100 mAh	Protection type	IP 30
		Protection class	III
Sensor	NTC internal	Equipment	mechanical range restriction
Setting range	5 to 30 °C		
Lowering	in combination with watch transmitter (pilot function) adjustable to the reduced temperature set on the watch transmitter	Admissible humidity	max. 95 % r.H., non-condensing
		Storage temperature	– 10 to + 50 °C
		Safety and EMC	according to DIN EN 60950-1 and DIN EN 300220
Transmitting frequency	868.3 MHz		
Transmitting interval	approx. 3 min and after nominal value change	Ambient temperature	– 10 to + 50 °C
		Colour case	pure white, sim. to RAL 9010
Range	150 m line-of-sight, up to 30 m in buildings (depending on construction)	Material case	plastic ABS
		Mounting/fixing	direct surface or wall mounted for instance with screws or adhesive strip
LED	learning mode, battery empty status display	Art. no.	319620

Room Controller Receiver 4-/8-channel for CLIMALINE Ceiling Systems – Surface-Mounted

Radio receiver, which in combination with the CLIMALINE radio transmitter realizes a single room climate control.

Functions: heating, cooling with adjustable neutral zone; heating/cooling switch at the device or via external contact; ON/OFF-switching via contact with anti-freeze function; single channels can be ruled out of the cooling. Interruption of cooling in case of condensation by dew point sensor or contact; cooling limit temperature 18 °C; energy-safe-function either centrally via external clock timer or locally via master-slave-mode (max. 4/8 time zones possible, i.e. up to 4/8 transmitters can be connected, with watch); status display of radio connection for each channel, automatic emergency mode in case of connection loss;

Control types: average value generation, (up to 8 transmitters programmable per channel + 1 transmitter for master-slave-mode) or central control (single channels can be switched to an external setpoint generator, authority function/central control). The upper part can be removed to program the radio transmitters in the individual rooms.

The power supply during this time is guaranteed by a customary 9 V battery. Thanks to the channel selection and a programming button, the transmitters can be programmed very simply.

Mounting: 4 screws for wall assembly are included in the standard scope of delivery.

4-channel radio-controller (receiver) for mounting in the distributor; application: heating, cooling or heating and cooling; 4 relay contacts/closings 5 (1) A, max. 4 actuators per heating circuit can be connected directly (max. 16 actuators in total); including pump module (max. 180 VA)

8-channel radio-controller (receiver) for mounting in the distributor; application: heating, cooling or heating and cooling; 8 relay contacts/closings 5 (1) A, max. 4 actuators per heating circuit can be connected directly (max. 32 actuators in total); including pump module (max. 180 VA)

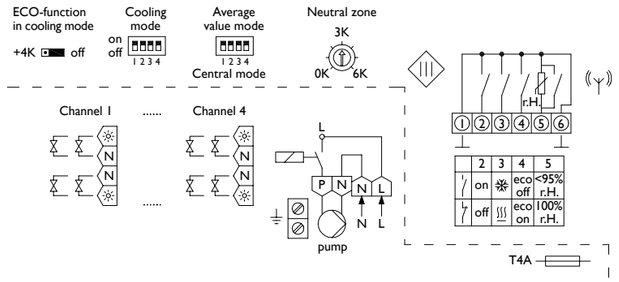
Technical Data

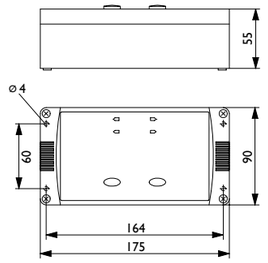
Operating voltage	230 V ~, 50 Hz
Switching differential	approx. 0.5 K (room temp.)
Receiving frequency	868.3 MHz
Aerial	(4-/8-channel) integrated, if necessary additional aerial JZ-25 + cable JZ 26
Display	3-colour-LED, one LED each channel

Display mode: display of programming, correct radio connection, passing below the dew point, loss of connection, display of the status heating or cooling by pressing the channel button.

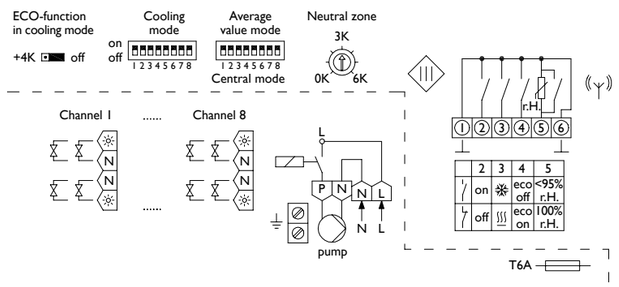
Protection type	IP 20 (KTFRL), IP 65 (KTFRD)	Material case	industry case, plastic
Protection class	II for user of protection class I and II	Mounting/fixing	with 4 supplied screws
		Electric connections	clips 0.5 – 1.5 mm²
Safety and EMC	acc. to DIN EN 60950-1 and DIN EN 300220	Emergency operation	If the radio connection is lost, after one hour all receivers run in emergency mode (ED 30 %)
Admissible humidity	max. 95 % r.H., non-condensing		
Storage temperature	– 20 to + 70 °C		
Ambient temperature	– 10 to + 50 °C	Art. no.	231057 (4-channel model)
Colour case	light grey, sim. to RAL 7035		231058 (8-channel model)

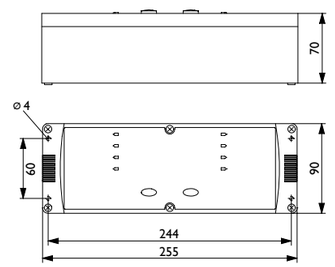
4-channel radio climate controller



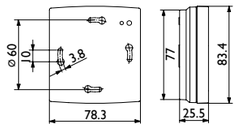


8-channel radio climate control-





Room Controller Receiver 1-channel for CLIMALINE Ceiling Systems – Surface-Mounted



This radio climate controller receives the target and actual values from the programmed transmitters and switches on the cooling if the target value + neutral zone is exceeded. Up to 10 different transmitters can be programmed on the receiver. In the event of a power cut or reconnection, the programmed transmitters are saved. The controller is active again 5 minutes maximum after the power has been restored. The transmitter with the watch has an ON/OFF-button, which can be used to interrupt the controller.

The receiver has a jumper to select between the two engery saving functions, either 4K target-temperature increase or Cooling OFF. The chosen function starts as soon as the energy saving function has been activated. In the factory setting the jumper is set to 4K target-temperature increase.

If the cooling is switched off in ECO mode, the jumper must be removed.

Further functions are mean value formulation, the master-slave-control and the central control.

Technical Data

Operating voltage	230 V ~, 50 Hz	Protection class	II, after appropriate mounting
Switch power	10 (2) A / 230 V	Admissible humidity	max. 95 % r.H., non-condensing
Switch contact	relay/closing contact		
Received power	approx. 1.5 W (14 VA)	Storage temperature	– 20 to + 70 °C
Control range	18 to 40 °C	Ambient temperature	– 20 to + 45 °C
Switching differential	approx. 0.5 K	Colour case	pure white, sim. to RAL 9010
Receiving frequency	868.3 MHz	Material case	plastic ABS
Protection type	IP 30, after appropriate mounting	Mounting/fixing	surface-mounted or in wall
		Art. no.	231056

Dew Point Sensor for CLIMALINE Ceiling Systems

10 m cable length, 2 cable straps – for pipes transporting cold water. Please note: because of the open construction, the sensor is only suitable for a clean environment and it must be installed in such a way that it can be replaced if necessary.

Art. no. 231166

Dew Point Controller for CLIMALINE Ceiling Systems

If the surface temperature of the dew point sensor is the same as the dew point itself a micro film of moisture occurs on his surface. This micro film changes the resistance of the dew point sensor to such an extent that the connected controller registers this change and deactivates the cooling. So even at max. cooling, dripping condensate and therefore moisture damage to the structure are prevented. After the dew point sensor has dried, the resistance value rises and the cooling is reactivated.

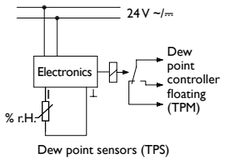
To make sure it is possible to detect in good time whether the temperature has fallen below the dew point, the dew point sensor must be fixed at the point where a fall in temperature is most probable.

Mostly these are the places in a room either close to the water supply or in the window areas. If the place cannot clearly be determined, it is possible to connect up to 5 dew point sensors in parallel to a controller or monitor. Sensors have to be ordered separately.

Equipment

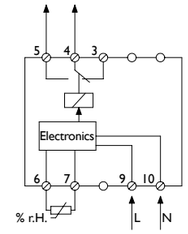
24 V ~/⎓ safety extra-low voltage;
Switching capacity:
Min. switched current: 5 mA,
Max. switched current: 10 (3) A
Max. contact voltage: 48 V ~ / 60 V
Protection class: III

At the sensor inlet up to 5 sensors can be connected in parallel – the sensors must be ordered separately (TPS)



230 V ~, 50 Hz
Switching capacity:
up to 230 V ~, 50 Hz max. 10 (3) A
up to 30 V ⎓ max. 10 A
up to 60 V ⎓ max. 1 A
Protection class: II, after appropriate mounting

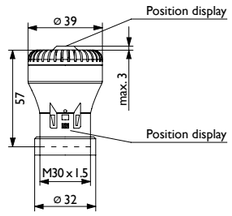
At the sensor inlet up to 5 sensors can be connected in parallel – the sensors must be ordered separately (TPS)



Technical Data

Operating voltage	see equipment	Admissible humidity	max. 95 % r.H., non-condensing
Input power	approx. 1 VA		
Sensor	external TPS, max. 5 pieces connectable	Storage temperature	– 20 to + 70 °C
		Safety and EMC	according to DIN EN 60730
Switch point	approx. 98 % r.H.	Ambient temperature	0 to 55 °C
Switching output	floating changeover contact	Colour case	light grey, sim. to RAL 7035
		Material case	plastic PC
Switching capacity	see equipment	Mounting/fixing	norm profile mounting
Min.-switching current	5 mA	Weight	NEHR/WFRRN approx. 160 g
Display (LED)	red (dew point release)	Electric connections	screw terminals
Protection type	IP 20	Art. no.	231175 (230 V model)
Protection class	see equipment		231174 (24 V model)

Electrothermal Valve Actuators for CLIMALINE Ceiling Systems



Extremely compact design. Thanks to their slim shape, the electrothermal valve actuators can be quickly and easily assembled in the area of the fastening nut.

Assembly in any position: drain holes on the side lead any leaking water from the valve tappet to the outside and prevent damage to the drive.

Additional valve monitoring: with two additional inspection windows on the side the valve position can easily be visually checked.

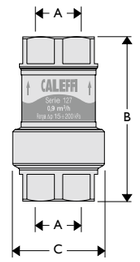
Equipment

Electrothermal valve actuator:	230 V	24 V
Operating voltage:	230 V ~, 50 Hz	24 V = or 24 V ~
Max. starting current:	approx. 0.3 A	approx. 0.5 A

Technical Data

Operating voltage	see equipment	Position display	on top and sidewise
Function type	currentless closed	Protection type	IP 42
Max. starting current	see equipment	Protection class	II
Continuous output	approx. 3 W	Safety and EMC	according to DIN EN 60730
Opening/closing time:	approx. 4 min	Colour case	pure white, sim. to RAL 9010
Nominal stroke	3 mm	Material case	PC with 20 % fibre glass
Nominal closing force	90 N	Mounting/fixing	M 30 x 1.5
Ambient temperature	0 to 50 °C	Weight	approx. 85 g
Storage temperature	– 20 to + 70 °C	Art. no.	231165 (230 V model)
Connection cable	0.8 m / 2 x 0.5 mm²		231173 (24 V model)

AUTOFLOW Automatic Flow Rate Control for CLIMALINE Ceiling Systems (0.12 – 5.0 m³/h)



A	B	C	Weight
½"	74	41	0.24 kg
¾"	74	41	0.25 kg
1"	120	61	0.76 kg
1 ¼"	110	61	0.75 kg
1 ½"	170	81	2.00 kg
2"	172	81	2.35 kg

AUTOFLOW valves are automatic mass flow limiters, which ensure a constant volume flow even in the event of fluctuations in the operating conditions of the hydraulic circuit of the cooling and heating system.

They help the automatic equalization of the system and guarantee the planned flow volume of each consumer.

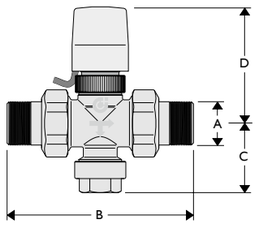
This series of AUTOFLOW valves comes with a replaceable, low-noise controlling element made of highly resistant polymer, insensitive to lime. It is especially suitable for use in heating and cooling systems.

The compact valve case needs only a small amount of space and can therefore be installed on the individual consumers or distributors without any problems.

Technical Data

Case	brass EN 12164 CW614N	Max. operating pressure	16 bar
Cartridge		Operating temperature	0 to 100 °C
– ½" to 1 ¼":	highly resistant polymer	Δp-range	15 to 200 kPa
– 1 ½" to 2":	highly resistant polymer and stainless steel	Flow volume	0.085 to 11 m³/h
		Precision	± 10 %
Spring	stainless steel	Connections	½" to 2", see table
Seals	EPDM		
Media	water, glycol dilutions	Art. no.	231160 (¾" model)
Max. glycol content	50 %		231139 (1" model)

Two-Way Zone Valve for CLIMALINE Ceiling Systems



Zone valves regulate the heat transfer medium in heating and cooling systems.

Combined with an electrothermal actuator and a room thermostat, they enable two-point control in the area of the hydraulic circuit in which they are used.

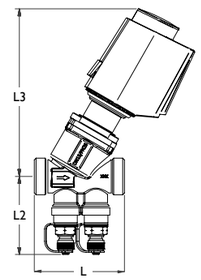
They are especially characterized by their low flow rate coefficient. Due to this they are well suited to controlling smaller zones or for direct use at the consumer.

A	B	C	D
½"	113	41	81
¾"	113	41	81
1"	122	41	81

Technical Data

Case	brass EN 12165 CW617N	Temperature range	0 to 95 °C
Gate	brass EN 12165 CW617N	Max. operating pressure	10 bar
Regulating spindle	rustproof steel	Max. pressure difference	1.2 bar
Seals in contact w. water	EPDM	Connections	½", ¾", 1", with bolting
Media	water, glycol dilutions	Art. no.	231162 (¾" model)
Max. glycol content	30 %		231161 (1" model)

OPTIMA Compact Pressure-Independent Balancing and Control



The OPTIMA Compact pressure-independent balancing and control valve for CLIMALINE ceiling systems can be used for heating and cooling in 2-pipe systems. Its linear control characteristic is used to handle two different mass flows for heating and cooling with only one valve.

The volume flow for the cooling system is adjusted on the OPTIMA Compact.

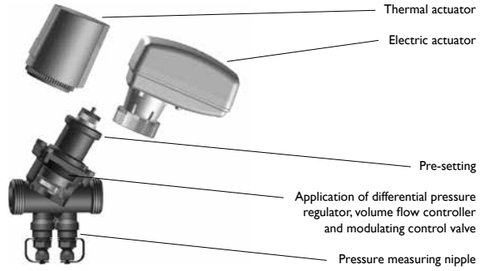
The mass flow of the heating system is limited by the volt-signal on the actuator.

Cooling system:
The maximum volume flow is set on the scale of the OPTIMA Compact. It can be adjusted from 0 l/h up to the volume flow set on the scale by an input-signal in a range of 0 – 10 V on the actuator.

Heating system:
The defined volume flow of the heating system is limited by the voltage on the actuator. It can be adjusted from 0 l/h up to the volume flow set on the scale by the limitation of the voltage on the actuator by an input-signal of 0 V.

Valve Dimension		DN10		DN15		DN20		DN25	
Connection thread*		AG/AG (G ½)	IG/IG (G ⅜)	AG/AG (G ¾)	IG/IG (G ½)	AG/AG (G 1)	IG/IG (G ¾)	AG/AG (G 1¼)	IG/IG (G 1)
Length	L	65	–	65	75	70	79	104	100
	L1	114	–	122	–	131	–	–	–
	L2	57	57	57	57	57	57	63	63
	L3	121	121	121	121	121	121	139	139
Weight	Basis	0.36	–	0.38	0.42	0.40	0.45	1.02	1.04
kg	DM	0.45	–	0.47	0.52	0.50	0.54	1.12	1.14

* AG/AG: male-/male-thread; IG/IG: female-/female-thread



Technical Data

Valve case	free of dezincification brass, CW602N
Differential pressure regulator	PPS 40 % glass
Spring	stainless steel
Membrane	HNBR
Seals	EPDM
Pressure stage	PN25
Max. differential press.	800 kPa

Medium temperature 0 to 120 °C

Dimension	Model	Volume flow
DN10	OPTIMA Compact Low	30 – 370 l/h
DN15	OPTIMA Compact Low	30 – 370 l/h
DN15	OPTIMA Compact High	100 – 575 l/h
DN20	OPTIMA Compact High	100 – 1330 l/h
DN25	OPTIMA Compact	600 – 3600 l/h

Notes

Annex

Putting Into Operation

Rinsing

Once the Climaline ceiling systems have been installed, they must be rinsed with water to remove any impurities and dirt caused by installation.

You must rinse then until the emergent water is free of bubbles and dirt.

Venting

If flow noises or gurgling noises occur in the heating ceiling and/or cooling ceiling, you must vent the control zones including the main pipes and distribution lines accordingly. Otherwise the performance of the heating ceiling and/or cooling ceiling decreases substantially.

Venting occurs as follows: first you must ensure that the main and distributor pipes are vented and rinsed professionally by the building services trade responsible for installation.

Then the climate ceiling is vented room by room on the ventilation devices of the distributors.

Pressure test

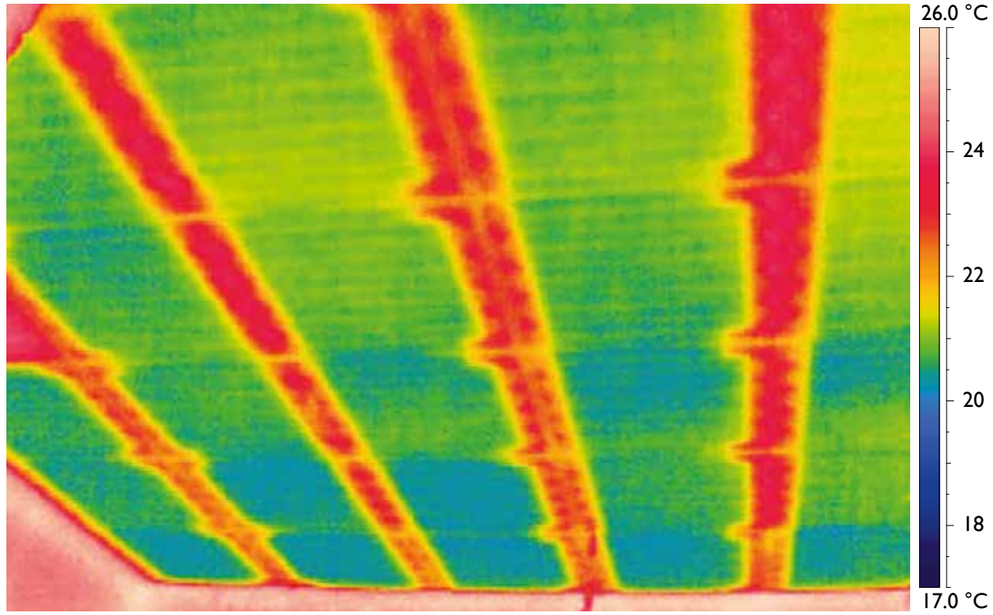
The system must be tested with a test pressure of 6 bar over a period of 10 minutes.

The pressure test has to be undertaken and documented by a professional HVAC company. The pressure must then be released to 0 bar.

Performance check / thermography

To check the behaviour and efficient functioning of the cooling ceiling, we recommend that you perform a thermographic test.

Among other things, thermography visualizes the functional efficiency and pipe routes of the heating and cooling ceilings in operation.



Notes

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