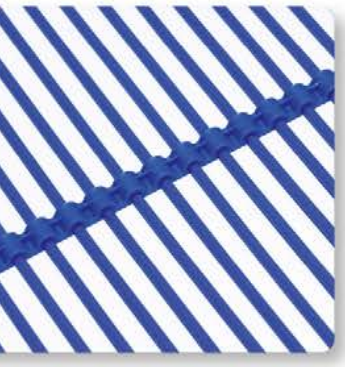
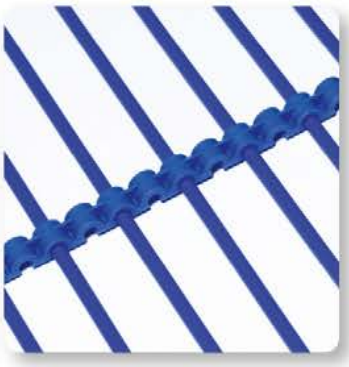
Clina

BETTER HEATING & COOLING





Product catalogue 2021

Index

1 Company 8

1.1 Introduction 8
1.2 Sales 9
1.3 Production 10
1.4 Service 11
1.5 Your contact person 12

2 Capillary Tube Systems for Heating and Cooling 14

2.1 Functional Principles and Features 14
2.2 Important information, product groups, supplementary conditions of delivery 17

3 Capillary Tube Mats for Heating and Cooling 20

3.1 Basic Types of Clina Mats 20
3.1.1 Extra charge for individual design – overview 23

3.2 ORIMAT 25
3.2.1 Heating and Cooling Mat ORIMAT G 10.00 | 10.11 | 10.20 | 10.02 | GM 10.11 26
3.2.2 Heating and Cooling Mat ORIMAT S 10.00 | 10.11 | 10.20 | 10.02 28

3.3 OPTIMAT 31
3.3.1 Heating and Cooling Mat OPTIMAT GB 20.00 | 20.11 | 20.20 | 20.02 | GBM 20.11 32
3.3.2 Heating and Cooling Mat OPTIMAT SB 10.00 | 10.11 | 10.20 | 10.02 34
3.3.3 Heating and Cooling Mat OPTIMAT SB 20.00 | 20.11 | 20.20 | 20.02 36

3.4 OVAMAT 39
3.4.1 Heating and Cooling Mat OVAMAT U 10.11 | UM 10.11 40
3.4.2 Heating and Cooling Mat OVAMAT G 10.11 | G 10.20 | G 10.02 | GM 10.11 42

3.5 FOLIMAT 45
3.5.1 Heating and Cooling Mat FOLIMAT FSB 20.00 | 20.11 | 20.20 | 20.02 46

4 Prefabricated products 50

4.1 OPTIPANEL 15 - unperforated 50
4.2 OPTIPANEL 18 - perforated 52
4.3 GYPSUM BOARD PANEL - perforated/unperforated 54
4.4 Assembly 56
4.5 GRAVIMAT 57

5 Tubes, Supply & Return Lines 62

5.1 Tubes 62
5.2 Supply & Return Lines 63
5.2.1 Supply & Return Lines with Single Connections 64
5.2.2 Supply & Return Lines with Double Connections 65

6 Push-Lock Connection System 68

6.1 Flexible Hoses 69
6.1.1 FLEXIBLE HOSES 10 69
6.1.2 FLEXIBLE HOSES 15 69

6.2 Push-Lock Connections ... 70
6.2.1 Push-Lock Connections 10 mm ... 70
6.2.2 Push-Lock Connections 15 mm ... 72

7 Fittings ... 76
7.1 Standard-Fittings ... 76
7.2 Special-Fittings ... 83

8 Measurement & Control Technology ... 86
8.1 Room Temperature Controller ... 86
8.2 Dew Point Sensor ... 90
8.3 Converter ... 91
8.4 Thermal Actuator ... 92

9 Separation System & Plastic Manifold ... 94
9.1 Separation Systems ... 94
9.2 Plastic Manifold ... 97

10 Fixing Material ... 100
10.1 Adhesive ... 100
10.2 Omega Ribbon/Distance Piece ... 101
10.3 Double Clamp ... 101
10.4 Pipe Bend Holder ... 101
10.5 Plastic Nail ... 102
10.6 Clina Optifix ... 102
10.7 Plastic Pipe Hook ... 102
10.8 Plastic Cliprail ... 103
10.9 Retaining Clip ... 103
10.10 Retainer ... 103

11 Tools & Assembly Kit ... 106
11.1 Pliers for cutting plastic ... 106
11.2 Quick Release Pliers Ø 10 mm ... 106
11.3 Butt-Welding Device ... 106
11.4 Device for heating element socket welding ... 106
11.5 Tools for heating element socket welding ... 107

12 Zero Risk for Builders and Plant Engineers ... 108

13 Standard Terms of Business ... 109

COMPANY

1 Company

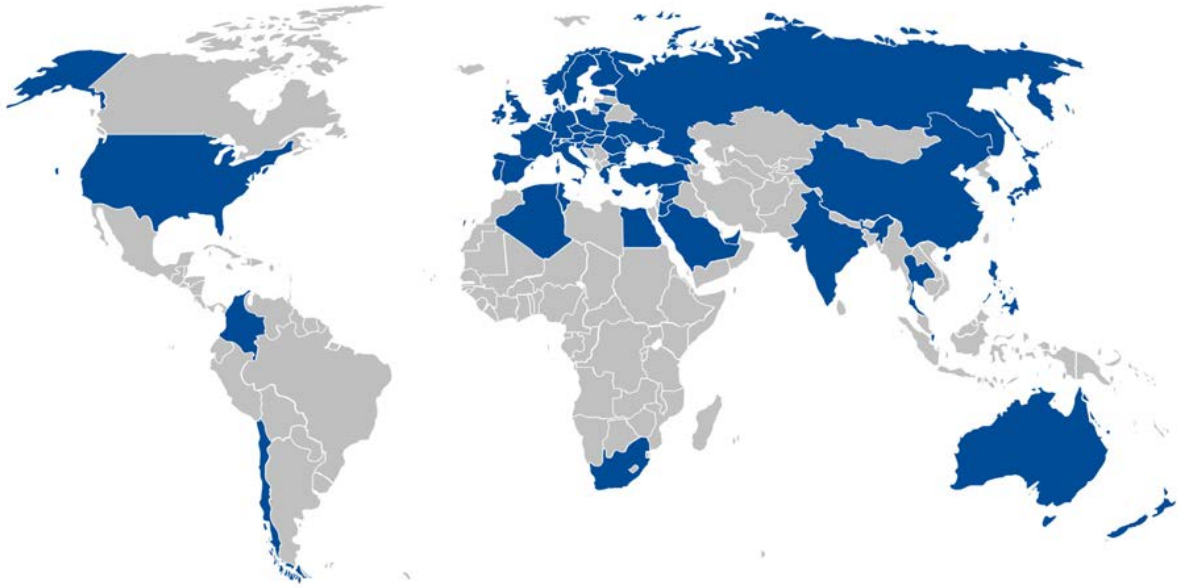
1.1 Introduction

Founder and owner Dipl.-Ing. Bechir Chahed

Clina Heiz- und Kühlelemente GmbH is the leading manufacturer of plastic capillary tube mats and was founded in 1994. Since its foundation, Clina has supplied customised capillary tube mats for more than 2000 projects worldwide.

The name Clina stands for **Cl**imatisation **na**turelle i.e., the natural temperature control (via radiation and convection) of rooms or buildings. From the very beginning, efficient heating and cooling with maximum comfort was at the centre of all our efforts. In order to protect the environment, Clina is working on to help significantly reduce society's primary energy requirements.

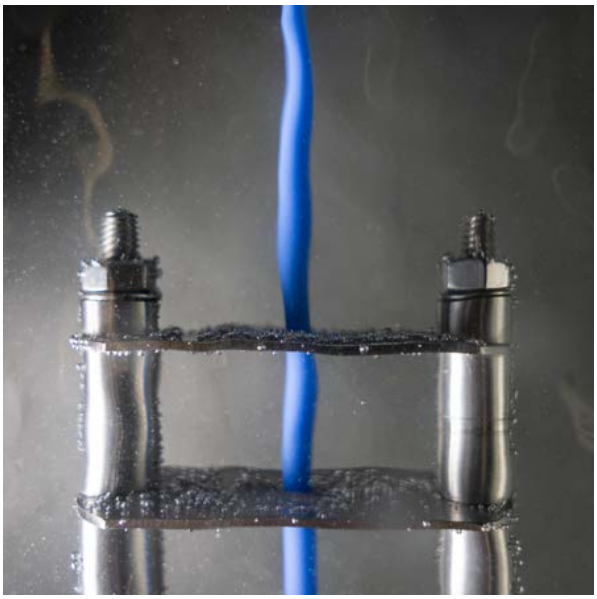
1.2 Sales



Clina distributes its products in more than 50 countries worldwide. In Germany, the products are sold directly to customers such as processors, builders, general contractors, etc. without intermediate trade.

In other European and non-European countries, Clina works with agents, installers and exclusive sales partners.

1.3 Production



All Clina capillary tube mats are manufactured in Germany. For about 25 years the production was exclusively located in Berlin. In order to meet the increasing demand, a supplementary production site was opened in Spreenhagen, Brandenburg in 2018. The trend of increasing demand continued, so that we have generously expanded the Spreenhagen production site in 2019-2020 and relocated the entire production there in summer 2020. High-quality polypropylene (PP-R) is used for all capillary tubes and mat distributor pipes.

Welding the capillary tubes to the mat distributor pipes plays a central role in the continuous development of the production machines. The unique welding technology ensures a very high-quality standard and enables a long-term guarantee.

Each product is subjected to an intensive quality control before it leaves the company.

1.4 Service

Clina develops, produces and sells **capillary tube mats** made of polypropylene as well as innovative system solutions and system components based on them.

In connection with heat pumps, efficient **heating and cooling systems** are created.
Further products in the field of **energy recovery**, **energy storage** and **dehumidification** are available.

Customers benefit from project-specific advice, including the following services:

OFFER PLANNING

- on the basis of technical specifications, project descriptions
- clarification of open technical questions with the customer or project planner
- for delivery of all system components including piping, separation system and manifold, measurement and control technology
- recommendation of experienced installation companies

PROJECT PLANNING WITH BIOCLINA

In connection with the placement of a BioClina order, we offer the following services on the basis of existing planning documents (floor plans, sections, heating load calculation etc.):

- designing of the BioClina system
- creation of a layout drawing for the capillary tube mats
- creation of piping plans
- creation of room data lists with hydraulic balancing
- creation of a part list of all required components for the project

ACQUISITION SUPPORT

- informative literature about our products, about system solutions with capillary tube mats etc.
- assistance and support from Clina engineers during acquisition meetings
- visit of Clina production site with the customer

CONSTRUCTION SITE SUPPORT

- recommendation of experienced installation companies
- installation guidelines

PLANNING AND TECHNICAL ADVICE

On the basis of available drawings for the building or for the premises and the data for the cooling load and heating load, we offer:

- assistance with draft planning
- assistance with design planning
  On the basis of existing CAD drawing sets, our engineers can draw the Clina capillary tube mats in your drawing.
- provision of planning documents:
  - calculation tools for hydraulics and for determining performance values of Clina capillary tube systems in various installations/applications
  - technical specifications
  - installation guidelines

1.5 Your contact person

HEAD OFFICE

Clina Heiz- und Kühlelemente GmbH
Eichhorster Weg 80
13435 Berlin
Germany
phone +49 30 402054-0

PRODUCTION / PROCESSING OF ORDERS

Diana Fehse
phone +49 30 402054-0
FEHSE@CLINA.DE

PRODUCTION SITE

Clina Heiz- und Kühlelemente GmbH
Am Winkel 11
15528 Spreenhagen
Germany
phone + 49 30 402054-0
INFO@CLINA.DE
WWW.CLINA.DE/EN
WWW.BIOCLINA.DE

TECHNICAL AND OFFER DEPARTMENT

Dipl.-Ing./Dipl.-Wirt.-Ing. Thomas Kresse
(graduate engineer)
phone + 49 30 402054-22
KRESSE@CLINA.DE

Hilmar Schwerdt
(state certified engineer)
phone + 49 30 402054-25
SCHWERDT@CLINA.DE

CEO

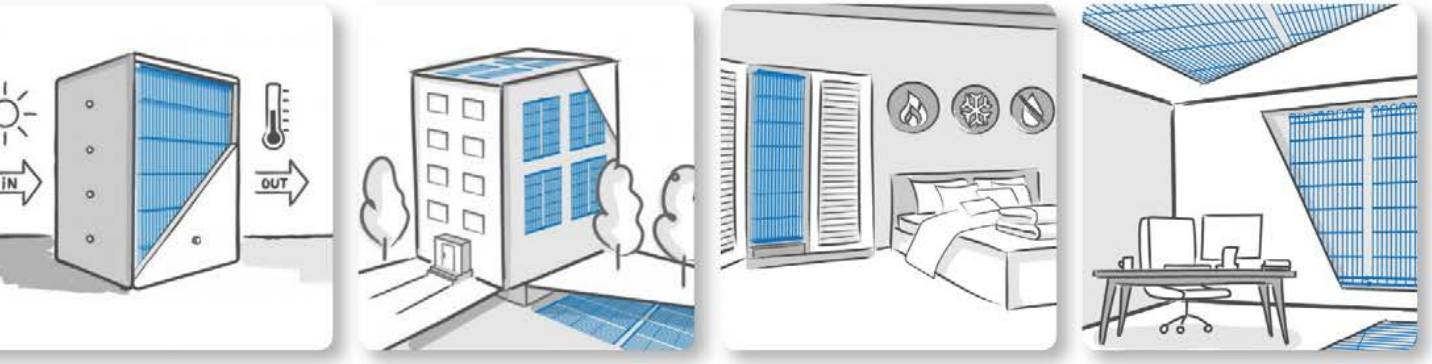
Dipl.-Ing. Bechir Chahed
(graduate engineer)
phone +49 30 402054-0

Dr.-Ing. Eduard Hoffmann
(Doctor engineer)
phone +49 30 402054-26
EDUARD.HOFFMANN@CLINA.DE

COMMERCIAL DEPARTMENT

INFO@CLINA.DE

HEATING & COOLING SYSTEMS



2 Capillary Tube Systems for Heating and Cooling

2.1 Functional Principles and Features

Clina Capillary Tube Mats are installed directly under the surface of one or several room enclosing surfaces – these can be the ceiling, the wall or the floor.

For heating or cooling spaces, warm or cold water flows through the very thin capillary tubes having outer diameters of 3.4 or 4.3 mm. The surfaces equipped with Clina mats are maintained at an even surface temperature. They ensure a quick dissipation of the cooling load or a quick supply of the heat requirement, mainly through radiation and partly through convection.

Due to the large exchange surfaces, considerable amounts of energy can be transferred draught-free and silent even at minor temperature differences between the active room surfaces and the room air.

For **COOLING** purposes, Clina Capillary Tube Mats are preferentially installed either in or on the ceiling; in this case the surface temperature of the ceiling is, depending on the supply temperature, approx. 19 °C at only 2 to 3 K spreading between supply and return (supply temperature = usually 16 °C; return temperature = 18 °C or 19 °C). Depending on the type of ceiling or the way the capillary tube mats are installed, cooling capacities of up to 100 W/m² (Δ=10 K) can be achieved for closed radiant cooling ceilings.

Surface cooling systems bear the risk of dew point exceedance and of condensation on the cold surface. This risk can be safely ruled out! Therefore, each control zone is equipped with one or several dew point sensors. To avoid condensation on the cooling surface, in case of a dew point risk the flow through the capillary tube mats is stopped by closing the control valve. Switching off the individual zones can be counteracted by using an enthalpy-based supply temperature control.

In large and intensively used office buildings cooling ceilings are often combined with a supporting ventilation system, so that dew point exceedance happens very rarely. This is necessary as a rule in order to provide all users with the required fresh air as well as to remove the bad air. The relative humidity is controlled by ventilation and maintained at a comfortable and dew point non-critical range for the users of approx. 50% relative humidity.

Due to the fact that the dissipation of the cooling loads, with this type of system combination, is performed by the cooling ceiling, the air change rate can be reduced to the hygienic minimum necessary (approx. two to three air changes per hour) and the size of the ventilation system can be considerably reduced.

For **HEATING** purposes, warm water with a temperature between 28 °C and 33 °C flows through the Clina Capillary Tube System. In this case, the surface temperature of the ceilings is at approx. 27-30 °C. That way, even during the heating phase, the radiant energy from the user (temperature about 32-35 °C) is transferred to the ceiling.

Studies have shown that, with a capacity of approx. 60-70 W/m², depending on the symmetry in radiation, no losses of comfort are expected when heating by the ceiling.

Higher outputs can be achieved via the floor surface (100 W/m² according to DIN) and the wall surface (130 W/m²), with full comfort.

Clina Systems are, of course, excellently suitable for floor or wall heating. In such applications, the heat-giving capillary tubes can be installed directly under the surface. Where floors are concerned, Clina Capillary Tube Mats can be placed directly under the floor covering (such as tiles, parquet, carpet) and above the load distribution layer.

Due to their considerably larger surface, Clina Capillary Tube Mats are much more efficient than conventional systems. This is evident from the fact that they require substantially lower supply temperatures to obtain the same heating capacity. Therefore, Clina Capillary Tube Technology is the ideal heat transfer system for heat pumps, whose coefficient of performance increases accordingly. Furthermore, Clina Capillary Tube Mats allow the realization of extraordinary low installation heights. For floors e.g., it is possible to apply the Clina Capillary Tube Mats not only in the screed, but also in the thin-layer process directly under the floor covering.

In general, Clina Heating and Cooling Systems are clearly more than conventional systems due to the position and geometry of the capillary tubes.

System separation

Clina Capillary Tube Mats are made of high quality and persistent polypropylene (PP-R) and are usually connected hydraulically with the same pipe material. Contrary to PEX-tubes known in connection with conventional floor heating, PP-tubes can be welded.

This characteristic offers major advantages for the installation (socket welding). Moreover, damages of the capillary tubes caused e.g., by external trades, can quickly and easily be repaired.

Like all weldable plastics, also polypropylene is oxygen diffusion-open. That means, up to the saturation point, oxygen gets through the wall of the PP-tubes in the water. Unless there are no measures taken (e.g., desalinated-water + Geno-safe A from the company Grünbeck) – measures which are also recommended for a conventional system - to protect the entire system against diffusion caused and micro bacteria corrosion, two separate water circuits are installed with the Clina System which are separated by a stainless steel heat exchanger.

That way you have two completely separate hydraulic circuits, called primary circuit (from the heat generator / cooling unit to the system separation) and secondary circuit (capillary tube system from the system separation onwards). The heat exchanger can be part of a compact transfer station which can consist of further system components such as pump, expansion vessel as well as shutoff and safety devices.

All components having contact with water in the secondary circuit must be made of corrosion-resistant materials such as plastic, bronze or brass. If this rule is upheld, a clogging of the capillary tubes is definitely excluded. As incoming oxygen causes no damage whatsoever, inhibitors are not required.

In large buildings, several separate secondary circuits are frequently designed which, for example, cover one storey or one structural component at a time. This system configuration has two practical advantages for the user:
In the event of damage with subsequently related leakage, the water volume escaping is limited to a minimum. Water can leak out only until the pressure in the respective secondary circuit has been reduced. Moreover, capillary tube mats contain only approx. 0,5 litres of water per square meter.
Furthermore, in case of reconstruction or maintenance work or operating trouble, only small partial units of the system have to be taken out of function and emptied if required.

Field of application of Clina Capillary Tube Systems

Clina Capillary Tube Systems are preferentially used in such areas where it is of utmost importance that the user is provided with optimum room conditions, meaning a comfortable and healthy indoor climate. Besides, architectural reasons (space requirement, flexibility, concealed technical system) as well as cost considerations very often play a significant role. As a low temperature system, the Clina Capillary Tube Technology makes a significant contribution towards the reduction of operating costs and towards the environmental benefit. Up to the present, these advantages were utilized particularly in large commercial offices and bank buildings. But Clina mats have been used successfully for many years, not only in new buildings but also in the renovation and modernization of buildings. For references we refer to our website (**WWW.CLINA.DE**).

As a result of our persistent and continued development of application options, we have succeeded in being able to offer extremely attractive and interesting solutions even for small-scale objects or living areas, such as BioClina Floor Heating or the convective cooling with Clina GRAVIMAT (convector).

Control concept

In principle, Clina Capillary Tube Systems are operated with a constant flow temperature. By means of an immersion sensor in the supply line of the system, the system temperature is compared with the set point and the mass flow on the primary side is controlled accordingly. Depending on the hydraulic system of the primary circuit, this constant valve is either a 2-way or a 3-way valve. We do not recommend a control of the supply temperature by means of a mixing loop in the secondary circuit due to the narrow spreading and the increase of pressure loss.

As a result of the low water content and the spreading of 2 K or 3 K, the zone control is effected as a two-point control (on/off). As a rule, a constant control of the mass flow is not considered practical as the two-point control is effective enough. Depending on the control signal of the room temperature controller, the electrothermal actuator on the relevant zone valve either opens or closes.

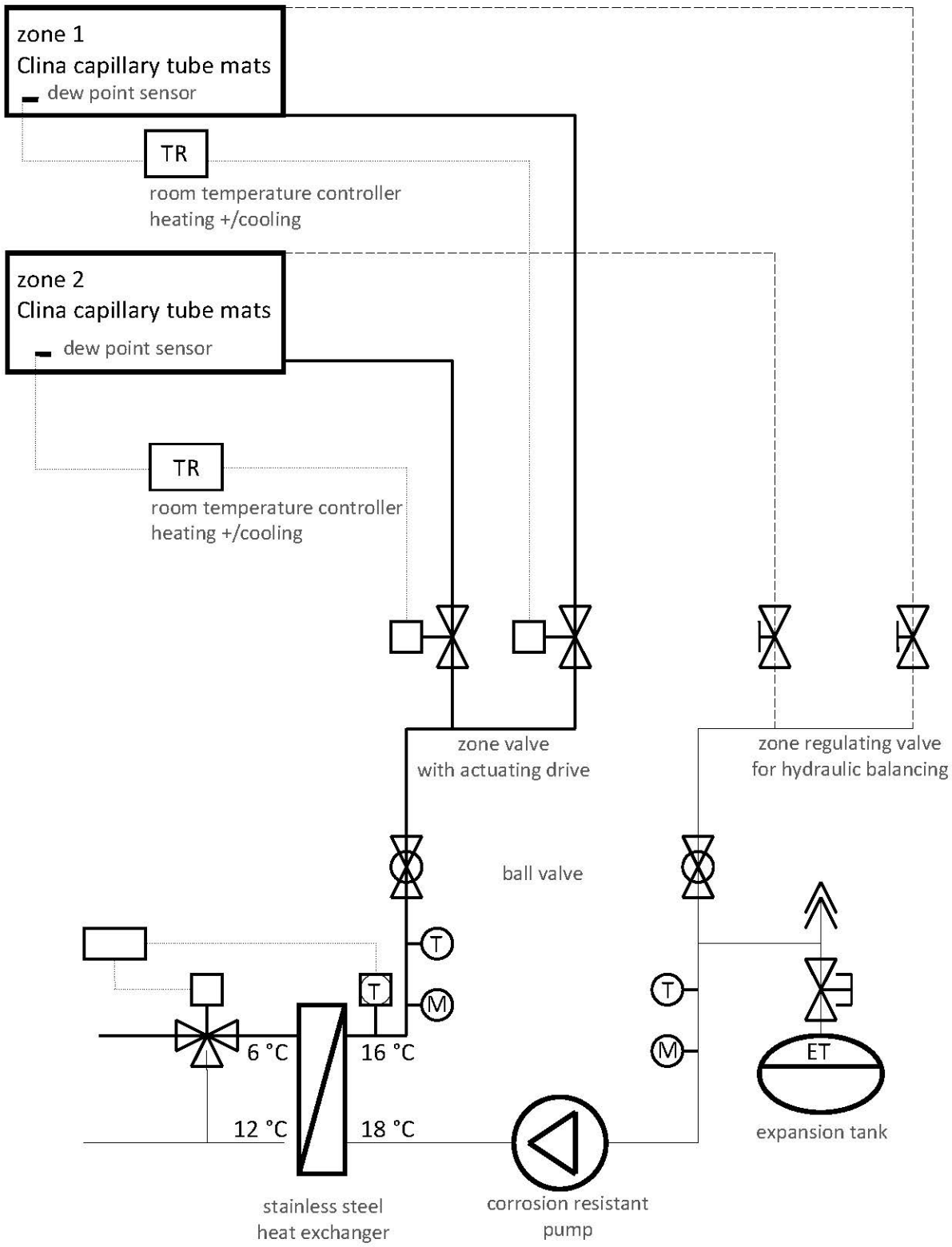
Zone temperature control is effected separately for each zone (individual room regulation) where the set point can have both central and decentral adjustment. A switchover between heating or cooling operation can also be carried out centrally.

In addition, each zone is equipped with a dew point sensor. This has only the function of a safety device which either shuts off the zone where there is a danger that the temperature falls below the dew point – even if the room temperature is above the set point – or it gradually raises the supply temperature according to the relative humidity of a reference room and/or the enthalpy of the ambient air condition.
With an increasing dew point, the under temperature of the system and also the capacity is reduced, but a continued operation of the cooling ceiling is still possible. When the humidity in the room has dropped again and condensation is ruled out, the system returns to the normal control mode.

The capacity of a cooling ceiling results from the mean under temperature to the room temperature, meaning, the higher this mean under temperature, the higher the capacity of the cooling ceiling.
Analogue, the capacity in case of heating results from the temperature difference between the mean over temperature and the room temperature.

Due to the low under or over temperature the user benefits from a very advantageous self-control effect.

System and control schematic



Principle sketch: Clina Capillary Tube System Cooling (temperature case)

2.2 Important information, product groups, supplementary conditions of delivery

All prices in this catalogue are quoted in EUR and ex works, plus the respective value added tax (VAT) applicable on the date of the invoice, plus packaging and shipping costs as well as other forwarding costs.

The respective percentage rates of the product groups are based on the framework agreement between the customer and us. New customers shall get in touch with the contact persons listed on page 12. We will also be pleased to make you a project-related offer for the supply of capillary tube mats and equipment.

Intermediate sizes of Clina Capillary Tube Mats are charged for the prices of the next bigger standard size.

All measures are quoted in millimetre (mm).

Regarding **panelled ceilings** please always specify the clearance size for the capillary tube mats and the panel type and its measurements respectively.

All the mats, fittings and pipes offered by Clina are made of high-quality polypropylene (PP-R), type 3. The extrapolated **lifespan** is more than 50 years. Temperature peaks of 100 °C arising from short disturbances are no problem for the material. Permanent temperatures of more than 60 °C, also dependent on the operating pressure, reduce the lifespan.

The following table gives you an overview to which product group the respective Clina articles belong.

CHAPTER	ARTICLE GROUP	PRODUCT GROUP
3	Capillary Tube Mats for Heating and Cooling	A
4	Prefabricated Products	B
5	Tubes, Supply & Return Lines	A
6	Connection Components	B
7	Fittings	B
8	Measurement & Control Technology	B
9	System Separation & Plastic Manifold	B
10	Fixing Material	B
11	Tools & Assembly Kit	C

Standard Terms of Busines see page 109

Supplementary terms of delivery

Depending on the agreements made, we also deliver our products or system components free to the domestic construction site (without unloading).

In these cases, the customer must ensure unhindered and risk-free access to the construction site.

Wartezeiten an der Baustelle gehen zu Lasten des Auftraggebers.

As a matter of principle, proper acceptance of the goods must be ensured by the purchaser. In his own interest, the buyer must have any ascertainable damage certified in writing by the deliverer upon receipt of the goods in order to safeguard his claims for damages.

Information for the purchase of Fittings and Equipment - Chapter 7

7.1 Standard Fittings

All fittings are DVGW - registered and in accordance with DIN 16962.

Delivery time: available at short notice

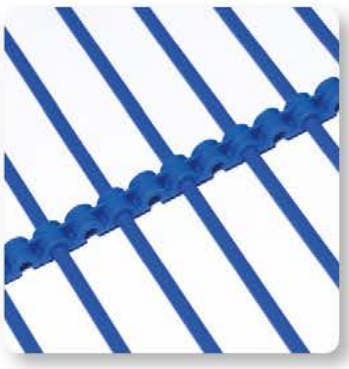
Packing unit (PU): The specified packing units (PU) should be respected when ordering. Single fittings are available on request.

7.2 Special Fittings

The measures and quality requirements are in accordance with DIN 16962.

Delivery time: available at short notice

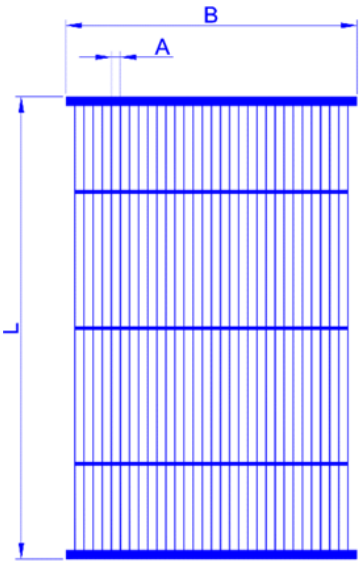
HEATING & COOLING MATS



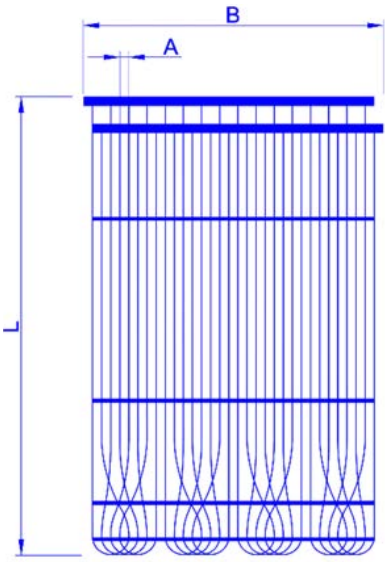
3 Capillary Tube Mats for Heating and Cooling

3.1 Basic Types of Clina Mats

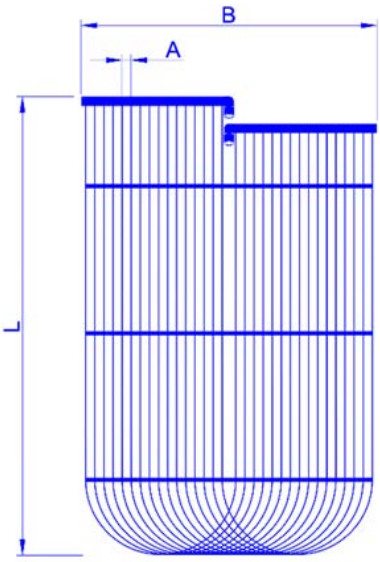
G-mat



S-mat



U-mat



ORIMAT

capillary tube 3,4 x 0,55 mm,
round mat distributor pipe 20 x 2,0 mm

The classical original Clina Capillary Tube Mat

OVAMAT

capillary tube 3,4 x 0,55 mm,
oval mat distributor pipe 20 x 12 x 2 mm (B x H x s)

The ideal capillary tube mat for metal panel and dry wall ceilings with a larger exchange surface and a lower installation height for the connections.

OPTIMAT

capillary tube 4,3 x 0,8 mm,
round mat distributor pipe 20 x 2,0 mm

The optimized capillary tube mat for heating and cooling, suitable for all applications by which the capillary tube mat is exposed to high mechanical and /or thermal loads.

Application under plaster, screed or concrete and as ground collector.

For special applications, also available with a larger round (25 x 2,3 mm) mat distributor pipe or a larger oval mat distributor pipe (20 x 12 x 2 mm).

FOLIMAT

capillary tube 4,3 x 0,8 mm,
round mat distributor pipe 20 x 2 mm

Prefabricated capillary tube element: Capillary tube mat fixed on a perforated insert foil for application on plane surfaces of floors, walls and ceilings.

Connection options:

Push-lock connections

The connection of the Clina mat to the supply lines is made with flexible Clina connecting hoses. The standard angular position of the connections for the **ORIMAT**, **OPTIMAT** and **FOLIMAT** is 60°.

Other angular positions (freely selectable) are also available, but must be **explicitly** specified in the order.

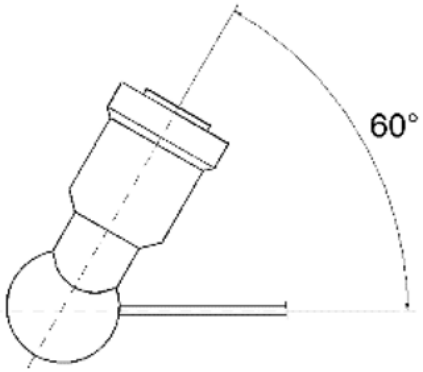


Fig.: side connection

The connections of the **OVAMAT** are available only in angular positions of 0°, 90°, 180° and 270°. The standard angular position of the connections for the **OVAMAT** is 90°.

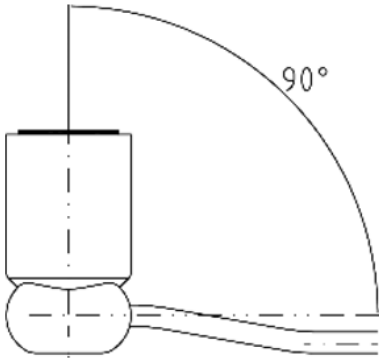


Fig.: oval mat distributor pipe

Open ends for welding connection

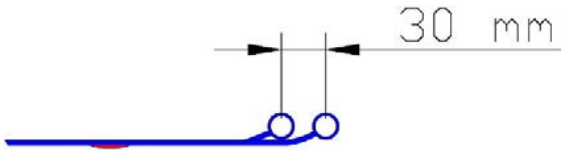
The open ends of the mat distributor pipes 20 x 2,0 mm are welded to the neighbouring mat and/or to the supply lines either by a butt weld or with a socket joint weld connection. The welding equipment required for this purpose is listed in chapter 10 "Tools and Assembly Kit" of the Clina catalogue.

Width of mats

The **standard - width** of the mat type S and G is **1000 mm**.
All other sizes can be configured in the factory as the customer wants.
By reason of delivery the maximum width is ≤ 1300 mm.

The available **width** of the mat type "FOLIMAT" is **300 mm or 600 mm**.

Distance of the mat distributor pipes | standard design



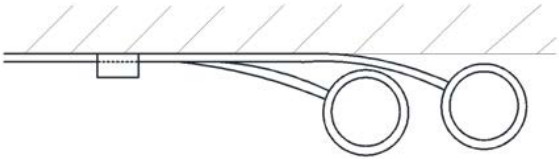
Custom made mats available on request!

Position of the Omega-ribbons concerning S-mats

Depending on the application and type of the Clina mats (only S-mats), the order must contain specifications as to how the Omega-ribbons have to be fixed to the mat.

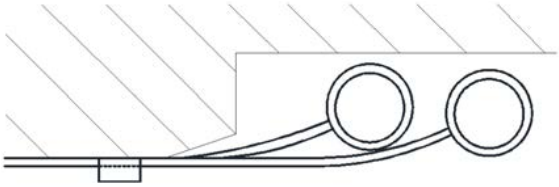
A difference is made between two mounting methods:
(Fig. shows capillary tube mat on bare concrete ceiling)

Omega-ribbons – normal mounting | standard design



If you wish to order the special design (rear mounting) instead of the standard design you have to **explicitly specify** this in your order.

Omega-ribbons – rear mounting | special design



PRODUCT GROUP A

Differentiation must be made in the following cases:

SER. NO.	TYPE OF APPLICATION	POSITION OF MAT DISTRIBUTOR PIPES	POSITION OF OMEGA-RIBBONS	SPECIFICATION IN YOUR ORDER
1	metal panel	in suspended ceiling	normal	N
2	plaster ceiling on bare concrete	in ceiling slot	rear	R
3	plaster ceiling on bare concrete	in wall slot, stucco edge / dry plate covering or overhead structure of room wall	normal	N
4	plaster ceiling to gypsum board ceiling	in suspended ceiling	rear	R
5	gypsum board ceiling (placed on top)	in suspended ceiling	normal	N
6	plastered wall	in screed / in suspended ceiling	normal	N
7	plastered wall	in wall slot	rear	R
8	floor heating	in floor blank space / in the insulation	rear	R
9	floor heating	in screed / on the insulation	normal	N

3.1.1 Extra charge for individual design – overview

For the following individual, customer made design the indications "right/left" apply for the view on the mat distributor pipes with the Omega-ribbon closed side up / on top (see fig. page 21!)

Mat distributor pipe extension

The mat distributor pipes, with an open welding end and a mat distributor pipe measuring 20 x 2,0 mm, can be extended at our factory by welding pipe parts to the mat distributor pipes.

DESIGN
with mat distributor pipe extension up to 150 mm

Push-lock connections

On demand the mats can be equipped at our factory with push-lock connections.

DESIGN
with welded-on straight push-lock connection FGAI 20/10 10 mm
with welded-on side connection 90° FSAI 20/10 10 mm
with welded-on straight push-lock connection FGAS 20/15 15 mm (push-lock connection with retaining ring)
with 2 welded-on push-lock connections 10 mm (FGAI 20/10 or FSAI 20/10) and 2 end caps
with 2 welded-on straight push-lock connections (FGAS 20/15) 15 mm and 2 end caps

Middle end cap

(cap in the middle of the mat distributor pipe)

For the individual design of the G-mat as GM mat type (see chapter 3.2.1) with the connections on one side an extra charge for the necessary middle end caps has to be calculated.

DESIGN
with welded-on middle end cap e.g., for GM mat type (1x per mat)

Socket, end cap or 90° elbow 20 mm

On demand we can weld at our factory a socket or a 90° elbow to the mat distributor pipe for the connection of further parts or pipe work on site or an end cap for the end fitting of the mat.

DESIGN
with welded-on socket*
with welded-on 90° elbow 20 mm*
with welded-on end cap 20 mm

* for technical reasons a leak test in our factory is not possible

Adhesive tape, adhesive and protecting foil

DESIGN
with double sided adhesive tape for attachment
with double sided adhesive tape "Bullran" for attachment
with adhesive and protecting foil over the whole surface

3.2 ORIMAT

capillary tube 3,4 x 0,55 mm – with round mat distributor pipe

FIELD OF APPLICATION/PRODUCT

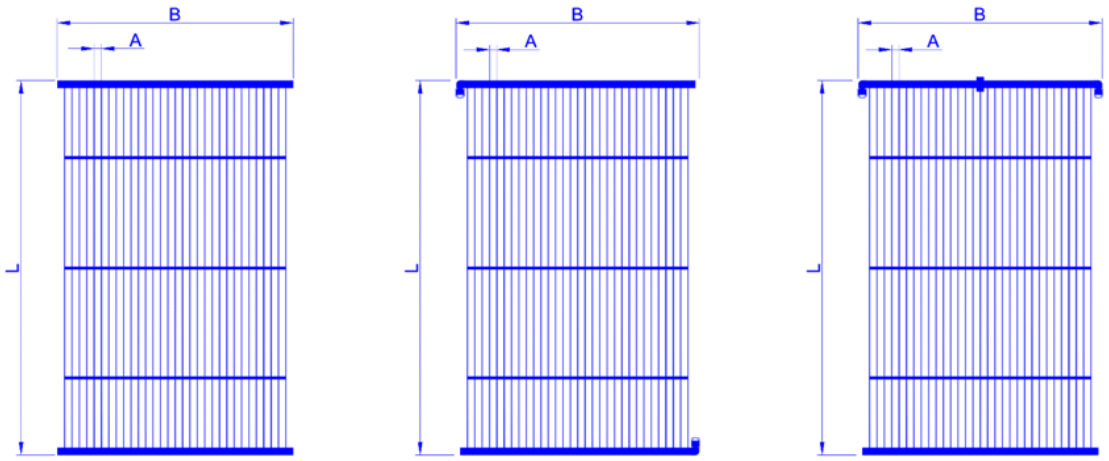
Field of application: gypsum board ceiling | jointless drywall ceiling with capillary tube mat applied on site, heating and cooling function
Product: ORIMAT S 10
Reference: V Tower Prague © PSJ Invest Prague

Field of application: acoustic plaster ceiling | BASWAphon COOL, multilayer system with integrated capillary tube mat, heating and cooling function
Product: ORIMAT G 10
Reference: Rolex Learning Centre Lausanne © Clina Heiz- und Kühlelemente GmbH

PRODUCT GROUP A

3.2.1 HEATING AND COOLING MAT ORIMAT G 10.00 | 10.11 | 10.20 | 10.02 | GM 10.11

G 10.00	G 10.11	GM 10.11
with open mat distributor pipes for welding	with 2 diagonal push-lock connections	with 2 lateral push-lock connections and 1 middle end cap



PUSH-LOCK CONNECTIONS

DESIGNATION	G 10.11	GM 10.11	G 10.20	G 10.02
BESCHREIBUNG	with 2 diagonal push-lock connections	with 2 lateral push-lock connections and 1 middle end cap	with 2 push-lock connections on the left	with 2 push-lock connections on the right
PICTOGRAM				

FIELD OF APPLICATION

- acoustic plaster ceiling | BASWAphon Cool
- drywall ceiling | gypsum board panels
- metal ceiling | metal tiles, metal panels
- room or wall element | convector GRAVIMAT

TECHNICAL DATA

MATERIAL/COLOUR	Polypropylene (PP-R) recyclable/blue
MAT DISTRIBUTOR PIPE	20 x 2,0 mm, round
CAPILLARY TUBE	**3,4 x 0,55 mm**
DISTANCE A	10 mm
LENGTH L	600-6000 mm in 10 mm steps
WIDTH W	as from 150 mm in 10 mm steps
CONNECTION TYPE	without connections/with 2 push-lock connections 10 mm or 15 mm
SPECIFIC WEIGHT	approx. 370 g/m² capillary tube surface
SPECIFIC VOLUME OF WATER	0,370 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT	approx. 740 g/m² capillary tube surface
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

ORIMAT G 10

Various lengths and widths are available for the capillary tube mat ORIMAT G 10 :

Length: 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | 5500 | 6000 mm

Width: 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 | 1000 mm

Ordering example for Clina capillary tube mat
type ORIMAT, G 10.00, length 2000 mm, width 500 mm without connections:

Item No.: type ORIMAT G 10 . 2000 . 0500 . 00

DESIGN

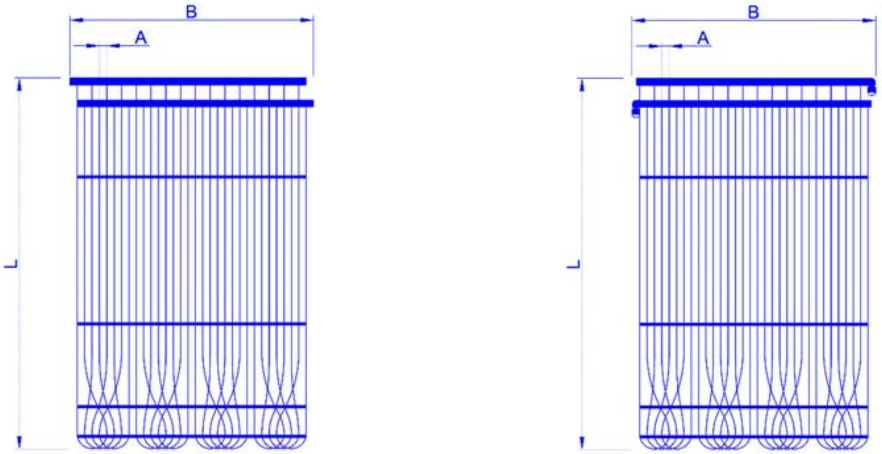
with 2 push-lock connections 10 mm and 2 end caps
with push-lock connections (straight) 15 mm and 2 end caps
with mat distributor pipe extension up to 150 mm
with welded-on middle end cap for mat type GM 10.11 (1x per mat)
with welded-on socket*
with welded-on 90°-elbow* or end cap

* for technical reasons a leak test in our factory is not possible

PRODUCT GROUP A

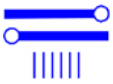
3.2.2 HEATING AND COOLING MAT ORIMAT S 10.00 | 10.11 | 10.20 | 10.02

S 10.00	S 10.11
with open mat distributor pipes for welding	with 2 lateral push-lock connections



schematic representation of loop overlap

PUSH-LOCK CONNECTIONS

DESIGNATION	S 10.00	S 10.11	S 10.20	S 10.02
DESCRIPTION	with open mat distributor pipes	with 2 diagonal push-lock connections	with 2 push-lock connections on the left	with 2 push-lock connections on the right
PICTOGRAM				

FIELD OF APPLICATION

- drywall ceiling and wall | gypsum boards
- floating ceiling | floating drywall ceiling
- metal ceiling | metal tiles, metal panels

TECHNICAL DATA

MATERIAL/COLOUR	Polypropylene (PP-R) recyclable/blue
MAT DISTRIBUTOR PIPE	20 x 2,0 mm, round
CAPILLARY TUBE	**3,4 x 0,55 mm**
DISTANCE A	10 mm
LENGTH L	600-6000 mm in 10 mm steps
WIDTH W	as from 150 mm in 20 mm steps
CONNECTION TYPE	without connections/with 2 push-lock connections 10 mm or 15 mm
SPECIFIC WEIGHT	approx. 370 g/m² capillary tube surface
SPECIFIC VOLUME OF WATER	0,370 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT	approx. 740 g/m² capillary tube surface
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

ORIMAT S 10

Various lengths and widths are available for the capillary tube mat ORIMAT S 10 :

Length: 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | 5500 | 6000 mm

Width: 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 | 1000 mm

Ordering example for Clina capillary tube mat
type ORIMAT, S 10.00, length 2000 mm, width 500 mm without connections:

Item No.: type ORIMAT S 10 . 2000 . 0500 . 00

DESIGN

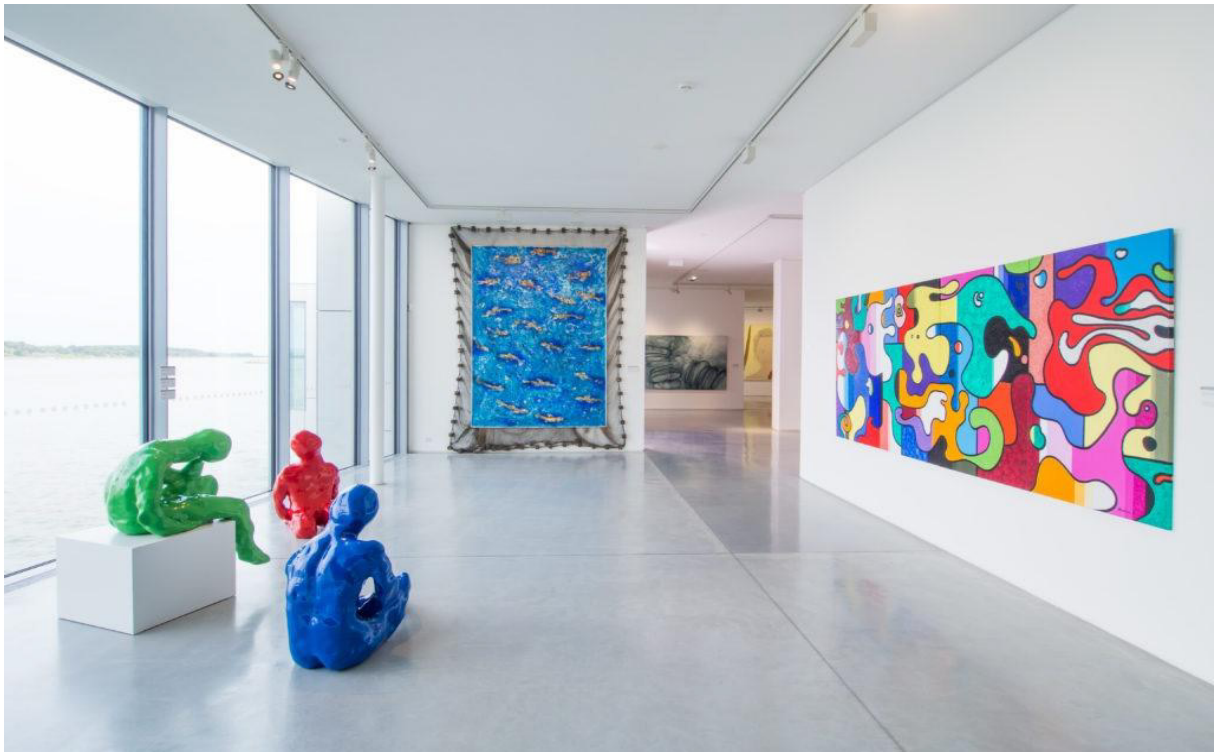
with 2 push-lock connections 10 mm and 2 end caps
with push-lock connections (straight) 15 mm and 2 end caps
with mat distributor pipe extension up to 150 mm
with welded-on socket*
with welded-on 90°-elbow* or end cap

* for technical reasons a leak test in our factory is not possible

3.3 OPTIMAT

capillary 4,3 x 0,8 mm – with round mat distributor pipe

FIELD OF APPLICATION/PRODUCT



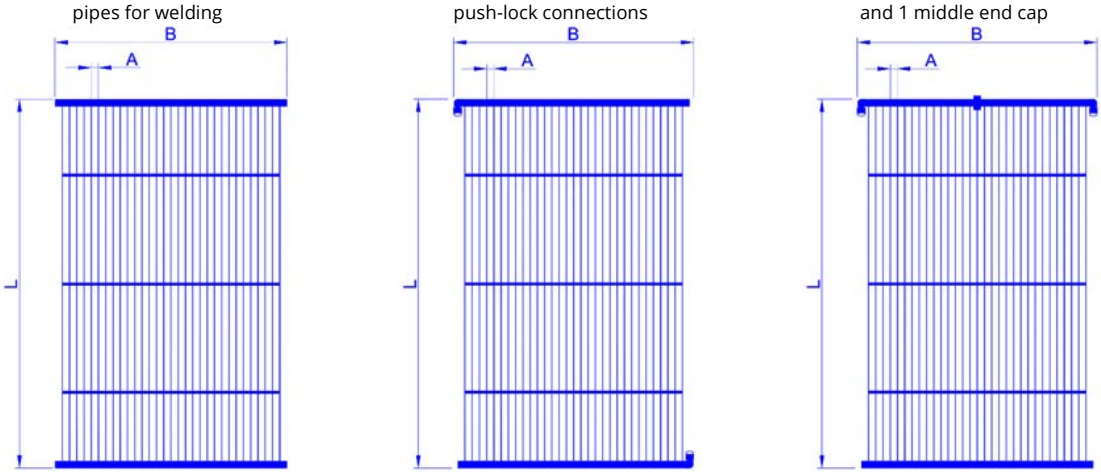
Field of application: plaster ceiling | plaster on concrete with capillary tube mat plastered-in, heating and cooling function
Product: OPTIMAT SB 20
Reference: © Danubiana Meulensteen Art Museum Bratislava

Field of application: plaster wall | plaster on brickwork with capillary tube mat plastered-in, plaster ceiling | plaster on bare ceiling with capillary tube mat plastered-in, heating and cooling function, floor | floor heating with capillary tube mat laid in screed, heating function
Product: OPTIMAT SB 20
Reference: Frauenkirche Meißen © Till Beck – stock.adobe.com

PRODUCT GROUP A

3.3.1 HEATING AND COOLING MAT OPTIMAT GB 20.00 | 20.11 | 20.20 | 20.02 | GBM 20.11

GB 20.00	GB 20.11	GBM 20.11
with open mat distributor pipes for welding	with 2 diagonal push-lock connections	with 2 lateral push-lock connections and 1 middle end cap



PUSH-LOCK CONNECTIONS

DESIGNATION	GB 20.11	GBM 20.11	GB 20.20	GB 20.02
DESCRIPTION	with 2 diagonal push-lock connections	with 2 lateral push-lock connections and 1 middle end cap	with 2 push-lock connections on the left	with 2 push-lock connections on the right
PICTOGRAM				

FIELD OF APPLICATION

- concrete ceiling or wall | prefabricated concrete element, in-situ concrete (ceiling)
- plaster ceiling or wall | bare concrete, brick wall, gypsum board
- floor | **in** screed
- soil | ground collector

TECHNICAL DATA

MATERIAL/COLOUR	Polypropylene (PP-R) recyclable/blue
MAT DISTRIBUTOR PIPE	20 x 2,0 mm, round
CAPILLARY TUBE	**4,3 x 0,8 mm**
DISTANCE A	20 mm
LENGTH L	600-6000 mm in 10 mm steps
WIDTH W	as from 150 mm in 20 mm steps
CONNECTION TYPE	without connections/with 2 push-lock connections 10 mm or 15 mm
SPECIFIC WEIGHT	approx. 430 g/m² capillary tube surface
SPECIFIC VOLUME OF WATER	0,320 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT	approx. 750 g/m² capillary tube surface
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

OPTIMAT GB 20

Various lengths and widths are available for the capillary tube mat OPTIMAT GB 20 :

Length: 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | 5500 | 6000 mm

Width: 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 | 1000 mm

Ordering example for Clina capillary tube mat
type OPTIMAT, GB 20.00, length 2500 mm, width 1000 mm without connections:

Item No.: type OPTIMAT GB 20 . 2500 . 1000 . 00

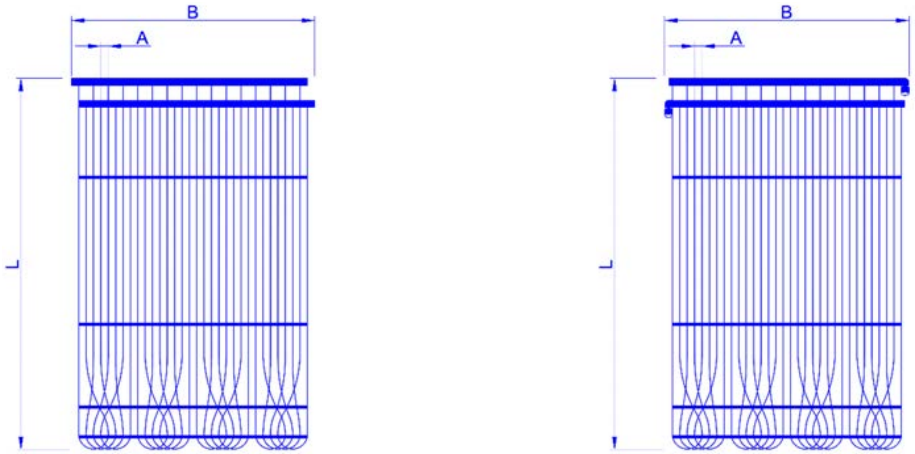
DESIGN
with 2 push-lock connections 10 mm and 2 end caps
with push-lock connections (straight) 15 mm and 2 end caps
with mat distributor pipe extension up to 150 mm
with welded-on middle end cap for mat type GBM 20.11 (1 per mat)
with welded-on socket*
with welded-on 90°-elbow* or end cap

* for technical reasons a leak test in our factory is not possible

PRODUCT GROUP A

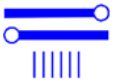
3.3.2 HEATING AND COOLING MAT OPTIMAT SB 10.00 | 10.11 | 10.20 | 10.02

SB 10.00	SB 10.11
with open mat distributor pipes for welding	with 2 lateral push-lock connections



Schematic representation of loop overlap

PUSH-LOCK CONNECTIONS

DESIGNATION	SB 10.00	SB 10.11	SB 10.20	SB 10.02
DESCRIPTION	with open mat distributor pipes	with 2 diagonal push-lock connections	with 2 push-lock connections on the left	with 2 push-lock connections on the right
PICTOGRAM				

FIELD OF APPLICATION

- drywall ceiling or wall | gypsum board panels
- metal ceiling | metal tiles, metal panels

TECHNICAL DATA

MATERIAL/COLOUR	Polypropylene (PP-R) recyclable/blue
MAT DISTRIBUTOR PIPE	20 x 2,0 mm, round
CAPILLARY TUBE	**4,3 x 0,8 mm**
DISTANCE A	10 mm
LENGTH L	600-6000 mm in 10 mm steps
WIDTH W	as from 150 mm in 20 mm steps
CONNECTION TYPE	without connections/with 2 push-lock connections 10 mm or 15 mm
SPECIFIC WEIGHT	approx. 870 g/m² capillary tube surface
SPECIFIC VOLUME OF WATER	0,570 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT	approx. 1440 g/m² capillary tube surface
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

OPTIMAT SB 10

Various lengths and widths are available for the capillary tube mat OPTIMAT SB 10 :

Length: 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | 5500 | 6000 mm

Width: 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 | 1000 mm

Ordering example for Clina capillary tube mat
type OPTIMAT, SB 10.00, length 2500 mm, width 1000 mm without connections:

Item No.: type OPTIMAT SB 10 . 2500 . 1000 . 00

DESIGN

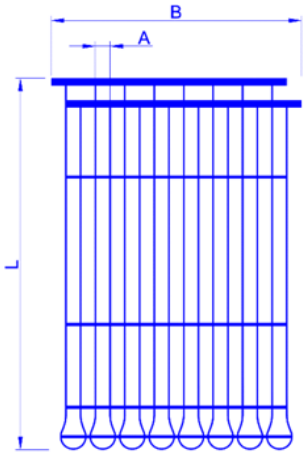
with 2 push-lock connections 10 mm and 2 end caps
with push-lock connections (straight) 15 mm and 2 end caps
with mat distributor pipe extension up to 150 mm
with welded-on socket*
with welded-on 90°-elbow* or end cap

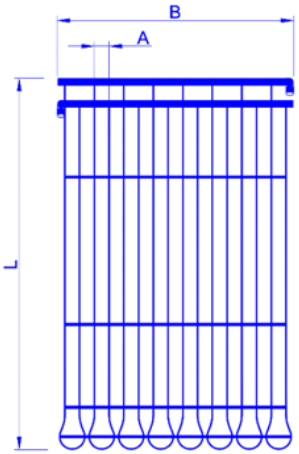
* for technical reasons a leak test in our factory is not possible

PRODUCT GROUP A

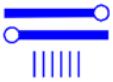
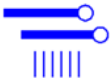
3.3.3 HEATING AND COOLING MAT OPTIMAT SB 20.00 | 20.11 | 20.20 | 20.02

SB 20.00	SB 20.11
with open mat distributor pipes for welding	with 2 lateral push-lock connections





PUSH-LOCK CONNECTIONS

DESIGNATION	SB 20.00	SB 20.11	SB 20.20	SB 20.02
DESCRIPTION	with open mat distributor pipes	with 2 diagonal push-lock connections	with 2 push-lock connections on the left	with 2 push-lock connections on the right
PICTOGRAM				

FIELD OF APPLICATION

- concrete ceiling or wall | prefabricated concrete element, in-situ concrete (ceiling)
- plaster ceiling or wall | bare concrete, brick wall, gypsum board
- floor | **in** screed

TECHNICAL DATA

MATERIAL/COLOUR	Polypropylene (PP-R) recyclable/blue
MAT DISTRIBUTOR PIPE	20 x 2,0 mm, round
CAPILLARY TUBE	**4,3 x 0,8 mm**
DISTANCE A	20 mm
LENGTH L	600-6000 mm in 10 mm steps
WIDTH W	as from 150 mm in 40 mm steps
CONNECTION TYPE	without connections/with 2 push-lock connections 10 mm or 15 mm
SPECIFIC WEIGHT	approx. 430 g/m² capillary tube surface
SPECIFIC VOLUME OF WATER	0,320 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT	approx. 750 g/m² capillary tube surface
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

OPTIMAT SB 20

Various lengths and widths are available for the capillary tube mat OPTIMAT SB 20 :

Length: 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | 5500 | 6000 mm

Width: 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 | 1000 mm

Ordering example for Clina capillary tube mat
type OPTIMAT, SB 20.00, length 2500 mm, width 1000 mm without connections:

Item No.: type OPTIMAT SB 20 . 2500 . 1000 . 00

DESIGN

with 2 push-lock connections 10 mm and 2 end caps
with push-lock connections (straight) 15 mm and 2 end caps
with mat distributor pipe extension up to 150 mm
with welded-on socket*
with welded-on 90°-elbow* or end cap
with double-sided adhesive tape type “Bullran” for attachment

* for technical reasons a leak test in our factory is not possible

3.4 OVAMAT

capillary 3,4 x 0,55 mm – with oval mat distributor pipe

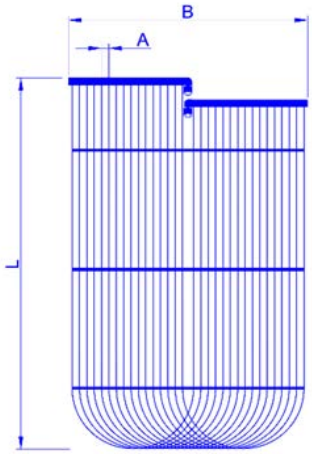
FIELD OF APPLICATION/PRODUCT

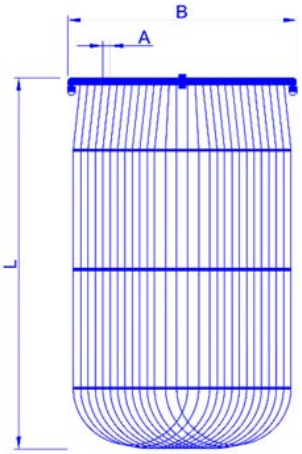
Field of application: metal ceiling | metal panel with integrated capillary tube mat OVAMAT, heating and cooling function
Product: OVAMAT U 10 / GM 10
Reference: Shibuya crossing Tokyo © SeanPavonePhoto– stock.adobe.com

Field of application: floating ceiling | metal floating ceiling with capillary tube mat fixed on the inside of the metal canopy
Product: OVAMAT G 10 | heating and cooling function
Reference: renovation Gustav-Heinemann-Ring Munich © S & L Kühldecken und Heizsysteme GmbH & Co. KG

3.4.1 HEATING AND COOLING MAT OVAMAT U 10.11 | UM 10.11

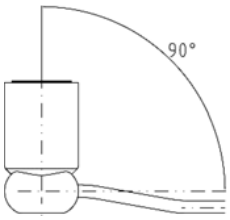
U 10.11	UM 10.11
with 2 push-lock connections in the middle	with 2 lateral push-lock connections and 1 middle end cap





PUSH-LOCK CONNECTIONS

DESIGNATION	U 10.11	UM 10.11
DESCRIPTION	with 2 push-lock connections in the middle	with 2 lateral push-lock connections and 1 middle end cap
ANGULAR POSITION PUSH-LOCK CONN.	90° (standard) 90°|270° possible	90° (standard) 90°|270° possible
PICTOGRAM		



angular position push-lock connection 90°
oval mat distributor pipe

FIELD OF APPLICATION

- floating ceiling | floating drywall ceiling
- metal ceiling | metal tiles, metal panels

TECHNICAL DATA

MATERIAL/COLOUR	Polypropylene (PP-R) recyclable/blue
MAT DISTRIBUTOR PIPE	**20 x 12 x 2,0 mm, oval**
CAPILLARY TUBE	**3,4 x 0,55 mm**
DISTANCE A	10 mm
LENGTH L	600-6000 mm in 10 mm steps
WIDTH W	as from 150 mm in 20 mm steps
CONNECTION TYPE	with 2 push-lock connections in the middle/ with 2 lateral push-lock connections 10 mm or 15 mm
SPECIFIC WEIGHT	approx. 430 g/m² capillary tube surface
SPECIFIC VOLUME OF WATER	0,430 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT	approx. 860 g/m² capillary tube surface
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

OVAMAT U 10.11 | UM 10.11

Various lengths and widths are available for the capillary tube mat OVAMAT U 10.11 and UM 10.11 :

Length: 600 | 750 | 1000 | 1250 | 1500 | 1750 | 2000 | 2250 | 2500 | 2750 | 3000 mm

Width: 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 | 1000 | 1050 | 1100 | 1150 | 1200 mm

Ordering example for Clina capillary tube mat
type OVAMAT, U 10.11, length 2000 mm, width 500 mm with push-lock connections:

Item No.: type OVAMAT U 10 . 2000 . 0500 . 11

DESIGN

with double-sided adhesive tape for attachment

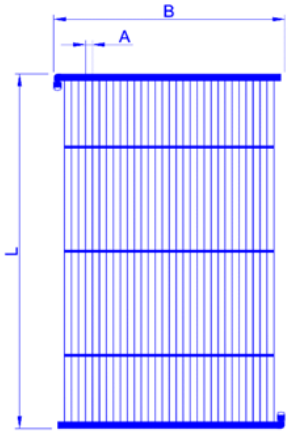
with adhesive and protecting foil over the whole surface

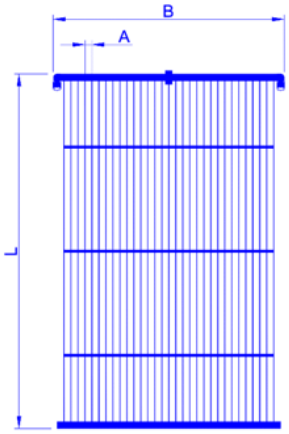
In case you need a connection with a different angular position than (90° or 270°) we offer the mat type “ORIMAT” with a **round** mat distributor pipe 20 x 2,0 mm.

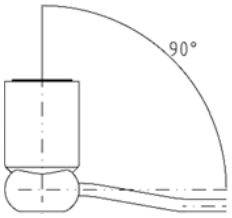
PRODUCT GROUP A

3.4.2 HEATING AND COOLING MAT OVAMAT G 10.11 | G 10.20 | G 10.02 | GM 10.11

G 10.11	GM 10. 11
with 2 diagonal push-lock connections	with 2 lateral push-lock connections and 1 middle end cap







angular position push-lock connection 90°
oval mat distributor pipe

PUSH-LOCK CONNECTIONS

DESIGNATION	G 10.11	GM 10.11	G 10.20	G 10.02
DESCRIPTION	with 2 diagonal push-lock connections	with 2 lateral push-lock connections and 1 middle end cap	with 2 push-lock connections on the left	with 2 push-lock connections on the right
ANGULAR POSITION PUSH-LOCK CONN.	90° (standard) 0°|90°|180°|270°	90° (standard) 0°|90°|180°|270°	90° (standard) 0°|90°|180°|270°	90° (standard) 0°|90°|180°|270°
PICTOGRAM				

FIELD OF APPLICATION

- floating ceiling | metal floating ceiling
- drywall ceiling | gypsum board panels
- metal ceiling | metal tiles, metal panels
- room or wall element | convector GRAVIMAT

TECHNICAL DATA

MATERIAL/COLOUR	Polypropylene (PP-R) recyclable/blue
MAT DISTRIBUTOR PIPE	**20 x 12 x 2,0 mm, oval**
CAPILLARY TUBE	**3,4 x 0,55 mm**
DISTANCE A	10 mm
LENGTH L	600-6000 mm in 10 mm steps
WIDTH W	as from 150 mm in 10 mm steps
CONNECTION TYPE	with 2 diagonal push-lock connections / with 2 push-lock connections 10 mm
SPECIFIC WEIGHT	approx. 370 g/m² capillary tube surface
SPECIFIC VOLUME OF WATER	0,370 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT	approx. 740 g/m² capillary tube surface
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

OVAMAT G 10.11 | G 10.20 | G 10.02

Various lengths and widths are available for the capillary tube mat OVAMAT G 10.11 | G 10.20 | G 10.02 :

Length: 600 | 750 | 1000 | 1250 | 1500 | 1750 | 2000 | 2250 | 2500 | 2750 | 3000 mm

Width: 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 | 1000 | 1050 | 1100 | 1150 | 1200 mm

Ordering example for Clina capillary tube mat
type OVAMAT, G 10.11, length 2000 mm, width 500 mm with 2 push-lock connections:

Item No.: type OVAMAT G 10 . 2000 . 0500 . 11

DESIGN

with welded-on middle end cap for mat type GM 10.11 (1x per mat)
with double sided-adhesive tape for attachment
with adhesive and protecting foil over the whole surface

In case you need a connection with a different angular position than (0°, 90°, 180° or 270°) we offer the mat type ORIMAT with a **round** mat distributor pipe 20 x 2,0 mm.

3.5 FOLIMAT

capillary 4,3 x 0,8 mm – with round mat distributor pipe

FIELD OF APPLICATION/PRODUCT

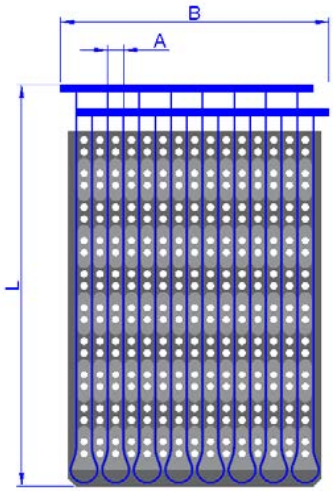
Field of application: floor | floor heating with capillary tube mat FOLIMAT placed onto screed
Product: OPTIMAT FSB 20
Reference: Refurbishment former Kaiserin-Augusta-Hospital Berlin © Felix Aries / Photography Hans Fonk

Field of application: floor | floor heating with capillary tube mat FOLIMAT placed onto wooden or drywall subfloor
Product: FOLIMAT FSB 20
Reference: Refurbishment former Kaiserin-Augusta-Hospital Berlin © Karl Storz Se & Co. KG

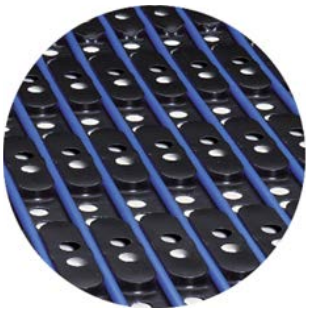
PRODUCT GROUP A

3.5.1 HEATING AND COOLING MAT FOLIMAT FSB 20.00 | 20.11 | 20.20 | 20.02

FSB 20.00	DETAIL

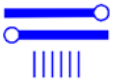


with open mat distributor
pipes for welding



capillary tube mat
in perforated foil insert

PUSH-LOCK CONNECTIONS

DESIGNATION	FSB 20.00	FSB 20.11	FSB 20.20	FSB 20.02
DESCRIPTION	with open mat distributor pipes	with 2 diagonal push-lock connections	with 2 push-lock connections on the left	with 2 push-lock connections on the right
PICTOGRAM				

FIELD OF APPLICATION

- floor | **onto** cement screed or floating screed
- floor | **onto** subfloors made of wood or dry construction elements
- ceiling and wall | for gluing and afterwards filling on stable subsurfaces

TECHNICAL DATA

MATERIAL/COLOUR	mat distributor pipe and capillary tube mat: Polypropylene (PP-R) recyclable/blue; insert foil: Polystyrene/black
MAT DISTRIBUTOR PIPE	20 x 2,0 mm, round
CAPILLARY TUBESB 20	**4,3 x 0,8 mm**
DISTANCE A	20 mm
LENGTH L	600-6000 mm in 10 mm steps
WIDTH W	300/600 mm
CONNECTION TYPE	without connections/with 2 push-lock connections 10 mm or 15 mm
SPECIFIC WEIGHT	approx. 700 g/m² capillary tube surface
SPECIFIC VOLUME OF WATER	0,320 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT	approx. 1020 g/m² capillary tube surface
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

FOLIMAT FSB 20

Various lengths and widths are available for the capillary tube mat FOLIMAT FSB 20 :

Length: 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | 5500 | 6000 mm

Width: 300 | 600

Ordering example for Clina capillary tube mat
type FOLIMAT, FSB 20.00, length 2500 mm, width 600 mm without push-lock connections:

Item No.: type FOLIMAT FSB 20 . 2500 . 0600 . 00

DESIGN
with 2 push-lock connections 10 mm and 2 end caps
with 2 push-lock connections 15 mm (straight) and 2 end caps
with mat distributor pipe extension up to 150 mm
with welded-on socket*
with welded-on 90°-elbow* or end cap

* for technical reasons a leak test in our factory is not possible

Before ordering FOLIMAT please contact Clina for the position of the mat distributor pipes!

PREFABRICATED PRODUCTS

PRODUCT GROUP B

PREFABRICATED PRODUCTS

4 Prefabricated products

4.1 OPTIPANEL 15 - unperforated

unperforated gypsum board panel with integrated capillary tube mat type OPTIMAT

FIELD OF APPLICATION/PRODUCT

Field of application: Gypsum board ceiling and wall| jointless gypsum board ceiling and wall with OPTIPANEL 15 (prefabricated unperforated gypsum board panel with integrated capillary tube mat OPTIMAT), heating and cooling function
Prefabricated product: OPTIPANEL 15, unperforated
Reference: Belfius Tower Brussels VIP Offices © Jaspers-Eyers Architects / Photography Nicolas Schimp

OPTIPANEL 15 - UNPERFORATED

unperforated gypsum board panel with integrated capillary tube mat type OPTIMAT

OPTIPANEL 15

substructure

PUSH-LOCK CONNECTIONS

DESIGNATION	OPTIPANEL (standard)	OPTIPANEL (alternative)
DESCRIPTION	with 2 push-lock connections on the left	with 2 lateral push-lock connections and 1 middle end cap
ANGULAR POSITION PUSH-LOCK CONNECTION	0°	0°
PICTOGRAM		

FIELD OF APPLICATION

- gypsum board ceiling
- gypsum board wall
- floating drywall ceiling

TECHNICAL DATA

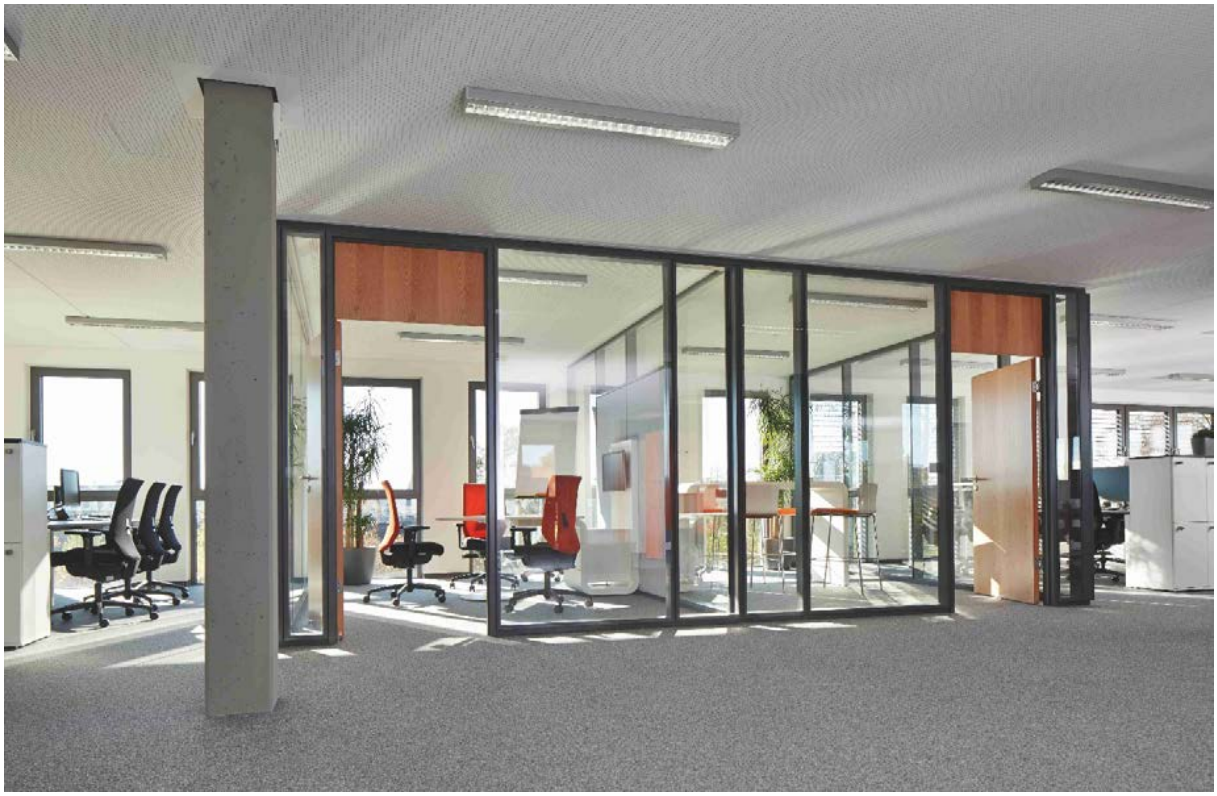
CAPILLARY TUBE MAT/COLOUR	Polypropylene (PP-R) recyclable/blue
MAT DISTRIBUTOR PIPE	20 x 2,0 mm, round
CAPILLARY TUBE MAT OPTIMAT	**4,3 x 0,8 mm**
DISTANCE OF THE CAPILLARY TUBES	15 mm centre-to-centre distance
GYPSUM BOARD PANEL	**unperforated**, with pre-drilled holes for fixation (standard)
LENGTH L	2.000 mm
WIDTH W	625 mm or 1.250 mm
PANEL THICKNESS	12,5 mm
CONNECTION TYPE	with 2 push-lock connections 10 mm, angular position 0°
SPECIFIC VOLUME OF WATER	0,320 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT (FILLED WITH WATER)	11 kg/m² plus substructure
PRESSURE STAGE:	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

PRODUCT GROUP B

4.2 OPTIPANEL 18 - perforated

perforated gypsum board panel with integrated capillary tube mat type OPTIMAT

FIELD OF APPLICATION/PRODUCT



Field of application: Gypsum board ceiling | jointless gypsum board ceiling with OPTIPANEL 18 (perforated gypsum board panel with integrated capillary tube mat OPTIMAT), heating and cooling function
Prefabricated product: OPTIPANEL 18, perforated
Reference: T-CON GmbH Co. KG Plattling Modern Office © Dauphin-Group

OPTIPANEL 18 - PERFORATED

perforated gypsum board panel with integrated capillary tube mat type OPTIMAT

OPTIPANEL 18

substructure

PUSH-LOCK CONNECTIONS

DESIGNATION	OPTIPANEL (standard)	OPTIPANEL (alternative)
DESCRIPTION	with 2 push-lock connections on the left	with 2 lateral push-lock connections and 1 middle end cap
ANGULAR POSITION PUSH-LOCK CONNECTION	0°	0°
PICTOGRAM		

FIELD OF APPLICATION

- gypsum board ceiling
- floating drywall ceiling

TECHNICAL DATA

CAPILLARY TUBE MAT/COLOUR	Polypropylene (PP-R) recyclable/blue
MAT DISTRIBUTOR PIPE	20 x 2,0 mm, round
CAPILLARY TUBEOPTIMAT	**4,3 x 0,8 mm**
DISTANCE OF THE CAPILLARY TUBES	18 mm centre-to-centre distance (standard hole pattern 8/18 R)
GYPSUM BOARD PANEL	**hole pattern** 8/18 R (standard); 12/25 R; 8/18 Q; 12/25 Q with black acoustic fleece backing
LENGTH L	1.988 mm (standard hole pattern 8/18 R)
WIDTH W	1.188 mm (standard hole pattern 8/18 R)
PANEL THICKNESS	12,5 mm
CONNECTION TYPE	with 2 push-lock connections 10 mm, angular position 0°
SPECIFIC VOLUME OF WATER	0,320 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT (FILLED WITH WATER)	9 kg/m² plus substructure
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

4.3 GYPSUM BOARD PANEL - perforated/unperforated

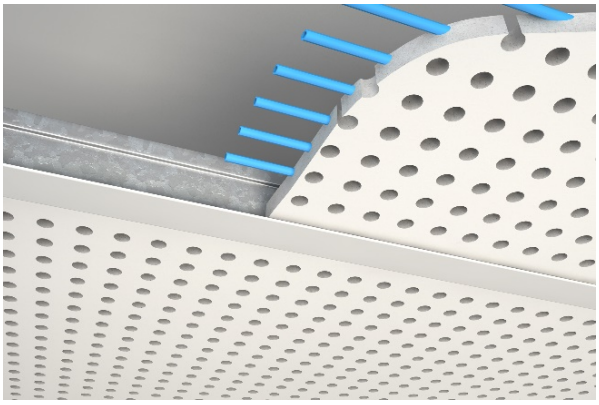
with integrated capillary tube mat type OVAMAT

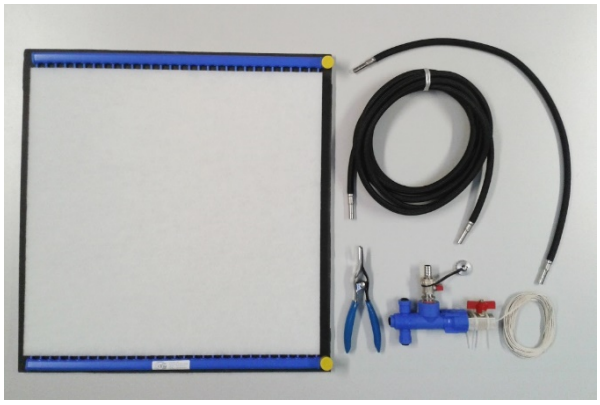
FIELD OF APPLICATION/PRODUCT

Field of application: Gypsum board ceiling | perforated gypsum board ceiling tile with integrated capillary tube mat OVAMAT, heating and cooling function
Prefabricated product: OVAMAT GB 18 / GB 15
Reference: SHK Innung Berlin © Clina Heiz- und Kühlelemente GmbH

GYPSUM BOARD PANEL - PERFORATED/UNPERFORATED

with integrated capillary tube mat type OVAMAT

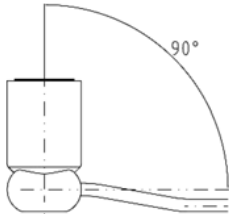




GYPSUM BOARD PANEL perforated

PUSH-LOCK CONNECTIONS

DESIGNATION	Gypsum Board Panel
DESCRIPTION	with 2 push-lock connections on the left
ANGULAR POSITION PUSH-LOCK CONNECTION	90°
PICTOGRAM	



angular position push-lock connection 90°
oval mat distributor pipe

FIELD OF APPLICATION

- gypsum board grid ceiling

TECHNICAL DATA

CAPILLARY TUBE MAT/COLOUR	Polypropylene (PP-R) recyclable/blue
MAT DISTRIBUTOR PIPE	20 x 12 x 2,0 mm, oval
CAPILLARY TUBEOVAMAT	**4,3 x 0,8 mm**
DISTANCE OF THE CAPILLARY TUBES	**18 mm** centre-to-centre distance (**perforated** version, standard hole pattern 8/18 R) **15 mm** centre-to-centre distance (**unperforated** version)
GYPSUM BOARD PANEL	**unperforated or perforated; hole pattern** 8/18 R (standard); 6/18 R; 12/25 R; 8/18 Q, 12/25 Q dull white surface finish, black acoustic fleece backing
LENGTH L X WIDTH W FOR GRID	1.250 x 625 mm, 1.200 x 600 mm, 625 x 625 mm (standard), 600 x 600 mm (standard hole pattern 8/18 R)
PANEL THICKNESS	12,5 mm
INSULATIING MATERIAL	with 30 mm CARUSO-ISO-BOND, WLG 040 acc. to panel dimensions
CONNECTION TYPE	with 2 push-lock connections 10 mm, angular position 90°
SPECIFIC VOLUME OF WATER	0,370 l/m² capillary tube surface
SPECIFIC TOTAL WEIGHT (FILLED WITH WATER)	10 kg/m² plus substructure
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

4.4 Assembly

MANIFOLDS

PRICES MANIFOLDS

ITEM NO.	DESCRIPTION
DUV 2	2-fold PP-ceiling sub distributor DN 15, consisting of ball valve 1/2", filling valve, 2 push-lock connections 10 mm
DUV 3	3-fold PP-ceiling sub distributor DN 15, consisting of ball valve 1/2", filling valve, 3 push-lock connections 10 mm
DUV 4	4-fold PP-ceiling sub distributor DN 15, consisting of ball valve 1/2", filling valve, 4 push-lock connections 10 mm
DUV 5	5-fold PP-ceiling sub distributor DN 15, consisting of ball valve 1/2", filling valve, 5 push-lock connections 10 mm
DUV 6	6-fold PP-ceiling sub distributor DN 15, consisting of ball valve 1/2", filling valve, 6 push-lock connections 10 mm

4.5 GRAVIMAT

convective air cooler with plastic capillary tube mats integrated in a cabinet or partition walls or wall line systems.

The convective acting GRAVIMAT is a cost-effective way to bring and maintain the air temperature and the humidity in the room to the desired value. This is achieved through the capillary tube mats integrated in the GRAVIMAT, through which in case of cooling cold-water flows.

The system of "silent cooling", which is independent of the dew point, thus makes it possible to dehumidify specifically, wherein the condensate accumulates in the housing and is carried off from there. The GRAVIMAT is therefore especially recommended in combination with other radiant cooling systems.

FRONT-WALL INSTALLATION

INTEGRATED INTO THE WALL

We offer you either a mat module consisting of individual capillary tube mats incl. assembly as a kit for a frame construction on-site or additionally a frame made of galvanized sheet steel for on-site casing.

Design on request

PRODUCT GROUP B

FIELD OF APPLICATION

Clina GRAVIMAT Systems with plastic capillary tube mats are a cost-efficient and powerful alternative or complementary to radiant cooling systems.

- suitable for zones, where radiant cooling systems alone are not sufficient due to the dew point problems
  - buildings in hot countries with a high level of humidity, without central pre-processing of the inlet air (dehumidification, precooling)
  - meeting places such as conference and meeting rooms, cinemas, restaurants

- for more cooling power - to cover peak-load conditions where radiant cooling systems alone are not sufficient
  - conference rooms / meeting rooms
  - offices

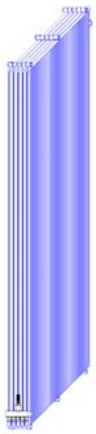
- for zones with temporary cooling or very cost-efficient cooling as in
  - hotel rooms
  - doctor's offices
  - conference rooms / meeting rooms
  - offices, due to the alignment or facade design
  - shopping malls
  - supermarkets

- for renovation, when a chilled ceiling is not suitable from the technical point of view or too expensive
  - buildings under monumental protection

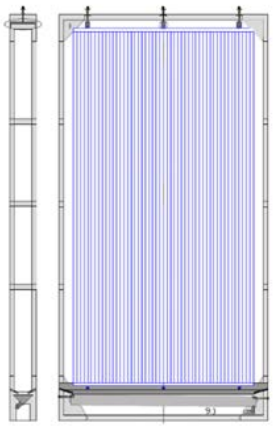
- for new applications apart from residential or office buildings:
  - production facilities (creation of "chilled islands")
  - animal farming and animal husbandry
  - storage rooms (agricultural and food industry)

GRAVIMAT – STANDARD DESIGN

convector for heating, cooling and dehumidifying with capillary tube mat OVAMAT G 10



mat unit with 5 capillary tube mats



mat unit with mounting frame and condensate tray

PUSH-LOCK CONNECTIONS

DESIGNATION	G 10.11	FDON 10	FSASS
DESCRIPTION	with 2 lateral push-lock connections per capillary tube mat	10 double nipple Ø 10 mm	1 connection kit for GRAVIMAT
ILLUSTRATION			

FIELD OF APPLICATION

- room or wall element

TECHNICAL DATA

MATERIAL/COLOUR	capillary tube mat: polypropylene (PP-R) recyclable/blue mounting frame: galvanized sheet steel; condensate tray: plastic
MAT DISTRIBUTOR PIPE	**20 x 2,0 mm, round**
CAPILLARY TUBE MAT OVAMAT G 10	3,4 x 0,55 mm (standard: mat unit with 5 capillary tube mats)
DISTANCE OF THE CAPILLARY TUBES	10 mm centre-to-centre distance
MOUNTING FRAME HEIGHT X WIDTH X DEPTH	2.270 x 1.160 x 150 mm (standard), variable in the height
FRAME COVERING/PANELLING	**not included** in the scope of delivery; tailorable, moisture proof and with openings for air circulation
CONNECTION TYPE	with push-lock system 15 mm
SPECIFIC VOLUME OF WATER	0,370 l/m² capillary tube surface
SPEC. TOTAL WEIGHT (FILLED WITH WATER)	approx. 31 kg/GRAVIMAT (mat unit incl. push-lock connections, condensate tray and mounting frame) plus frame covering/panelling
PRESSURE STAGE	PN 10
MAX. RECOMMENDED OPERAT. PRESSURE	4 bar
MAX. ALLOWED HEATING TEMPERATURE	60 °C

TUBES, SUPPLY & RETURN LINES

PRODUCT GROUP A

5 Tubes, Supply & Return Lines

5.1 TUBES

Clina tubes made of Polypropylene are suitable for many purposes e.g., they can be used for the connection of the Clina capillary tube mats to the floor manifolds.

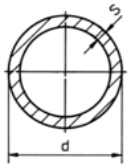
All Clina PP pipes comply with pressure rating PN 10 / SDR 11. The dimensions and quality requirements comply with DIN 8077, DIN 8078 and DIN EN ISO 15874.

The assembly of PP pipes is simple, fast, clean and safe (no open flames) due to the heating element socket welding process. A 100% homogeneous joint of the same material is created, so that both parts are really one piece molecularly homogeneous after the welding process. Basically, only the same types of plastic may be welded together.

For the professional assembly of PP pipes, a pipe cutter and a socket welding device with exchangeable heating elements in the different dimensions are required.

TECHNICAL DATA

DESCRIPTION	pipes PN 10
MATERIAL	PP-R
COULOUR	blue

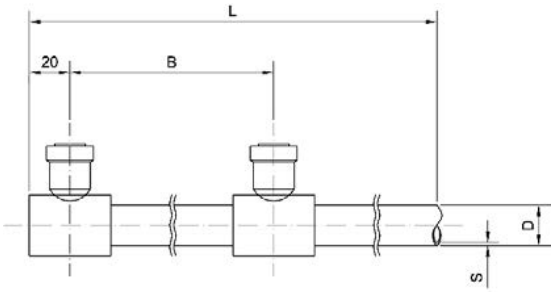


ITEM NO.	DIMENSIONS				PU
	D	DN	S	L	
R 20	20	15	2,0	4 m	4 m
R 25	25	20	2,3	4 m	4 m
R 32	32	25	3,0	4 m	4 m
R 40	40	32	3,7	4 m	4 m
R 50	50	40	4,6	4 m	4 m
R 63	63	50	5,8	4 m	4 m

Order example
Outer diameter d = 20 mm, quantity 40 m (tube à 4,0 m)

Item No.: R 20 . 4000 quantity: 10 pcs.

5.2 Supply & Return Lines



Clina Supply & Return Lines are used in such heating and cooling systems where Clina Capillary Tube Mats with connecting hoses are used, as for installations in suspended ceilings and metal panel ceilings.

The Clina Supply & Return Lines serve the internal tubing of the Clina Capillary Tube Mats in the room.

As a standard design, these Supply & Return Lines are made from a tube with the sizes 20 x 2,0 mm.

Subject to the machine fabrication of the Supply & Return Lines 20 x 2,0 mm, the smallest possible **gauge size (B)** between the push-lock connections is a **minimum of 200 mm**!

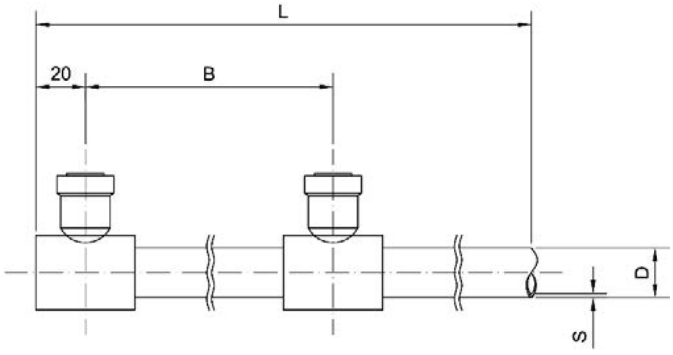
Smaller gauge sizes (B < 200 mm) are only available as customised products.

If you want to connect larger mat surfaces to any particular supply & return line, we are able to manufacture larger nominal widths such as 25 x 2,3 mm or 32 x 3,0 mm.

Feel free to contact us. We have the customised solution!

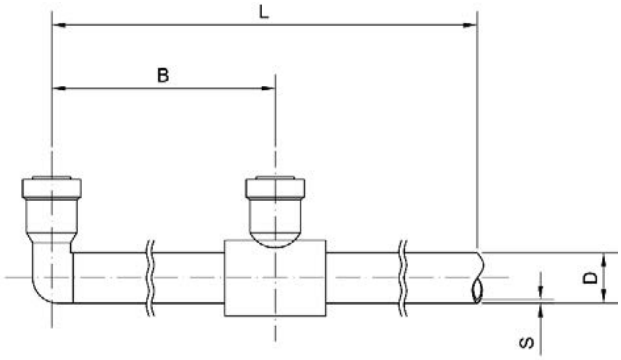
5.2.1 Supply & Return Lines with Single Connections

SUPPLY & RETURN LINES WITH SINGLE CONNECTIONS AND WELDING SOCKET – ZM



D = 20 mm S = 2,0 mm

SUPPLY & RETURN LINES WITH SINGLE CONNECTIONS AND SIDE CONNECTION – ZS



D = 20 mm S = 2,0 mm

TECHNICAL DATA ZM AND ZS

The supply & return lines with single connections are available in different lengths with different numbers of connections:

Length: 1000 | 2000 | 3000 | 4000 | 5000 | 6000 mm

No. of connections: 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

Order example: Supply & Return Lines with 3 connections including welding socket 2000 mm length, distance of the connections 600 mm:

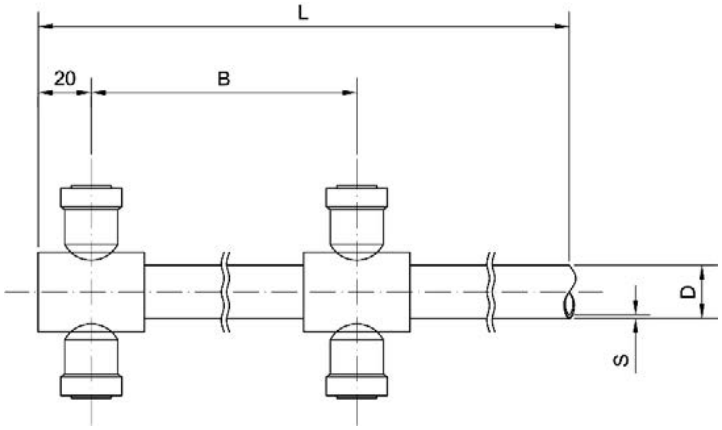
Item No.: ZM 03 . 2000 . 0600

Order example: Supply & Return Lines with 2 connections plus 1 side connection 2000 mm length, distance of the connections 600 mm:

Item No.: ZS 03 . 2000 . 0600

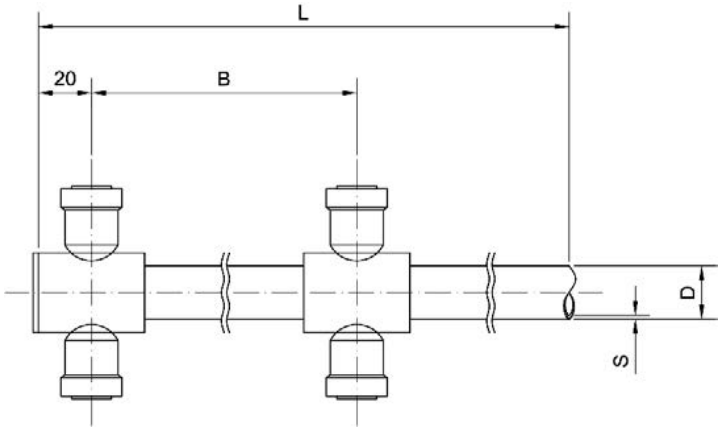
5.2.2 Supply & Return Lines with Double Connections

SUPPLY & RETURN LINES WITH DOUBLE CONNECTIONS AND WELDING SOCKET- ZDM



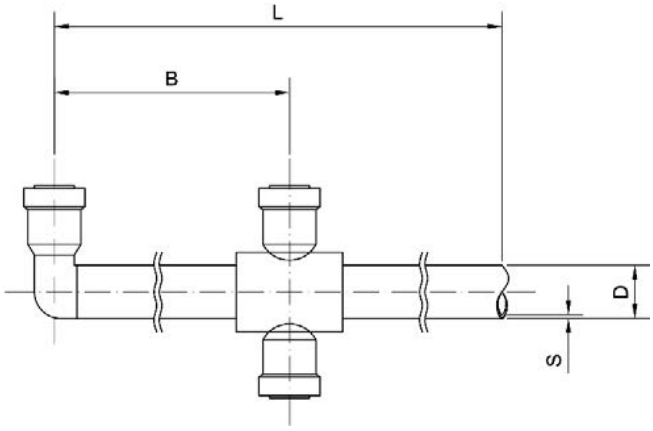
D = 20 mm S = 2,0 mm

SUPPLY & RETURN LINES WITH DOUBLE CONNECTIONS AND END CAP - ZDE



D = 20 mm S = 2,0 mm

SUPPLY & RETURN LINES WITH DOUBLE CONNECTIONS AND SIDE CONNECTION - ZDS



D = 20 mm S = 2,0 mm

TECHNICAL DATA ZDM, ZDE AND ZDS

The supply lines & return lines with double connections are available in different lengths with different numbers of connections:

Length: 1000 | 2000 | 3000 | 4000 | 5000 | 6000 mm

No. of connections: 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

Order example:
Supply & Return Lines with 3 double connections including welding socket; 2000 mm length, distance of the double connections 600 mm:

Item No.: ZDM 03 . 2000 . 0600

Order example:
Supply & Return Lines with 3 double connections and end cap 2000 mm length, distance of the double connections 600 m:

Item No.: ZDE 03 . 2000 . 0600

Order example:
Supply & Return Lines with 3 double connections plus 1 side connection; 2000 mm length, distance of the double connections 600 mm:

Item No.: ZDS 03 . 2000 . 0600

CONNECTION COMPONENTS

PRODUCT GROUP B

6 Push-Lock Connection System

The Clina connection system consists of flexible hoses and Clina push-lock connections. By inserting the flexible hoses, the capillary tube mats are easily and securely connected with the supply and return lines of the piping system. At present more than **2 million** Clina push-lock connections are Europe-wide in use.

Clina connection systems consist of guide sleeves and cartridges which were exclusively developed for Clina. The claw fastener ensures that these connections, which are under pressure, do not loosen or become leaky even after years of operational service. A guide sleeve ensures the correct seating of the hose nipple of the flexible hose. The nipples of the flexible hoses are made of rust-proof metal.

An O-ring is used for sealing purposes and this prevents water from coming into contact with the guide sleeve. The O-ring cannot be pressed out of its position even if the hose nipples are pressed in a diagonally angle.

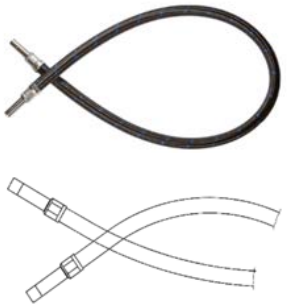
Clina connections are connected to the mat distributor pipe of the Clina capillary tube mat by socket welding or inside socket welding.

6.1 Flexible Hoses

6.1.1 FLEXIBLE HOSES 10

TECHNICAL DATA

DESIGNATION	flexible hoses for push-lock system 10 mm
ITEM NO.	SNY 10.
DN	10
HOSE NIPPLE Ø OUTSIDE	10 mm (on both sides)
LENGTH	500 mm, 800 mm, 1200 mm, 5000 mm
PRESSURE STAGE PN	10
MATERIAL/SURFACE	hose nipple: nickel-plated brass inner hose: EPDM coating: high pressure synthetic material



LENGTH	ITEM NO.
500 mm	SNY 10.0500
800 mm	SNY 10.0800
1200 mm	SNY 10.1200
5000 mm	SNY 10.5000

6.1.2 FLEXIBLE HOSES 15

TECHNICAL DATA

DESIGNATION	flexible hoses for push-lock system 15 mm
ITEM NO.	SNY 15.
DN	13
HOSE NIPPLE Ø OUTSIDE	15 mm (on both sides)
LENGTH	500 mm, 800 mm, 1200 mm
PRESSURE STAGE PN	10
MATERIAL/ SURFACE	hose nipple: nickel-plated brass inner hose: EPDM coating: high pressure synthetic material

LENGTH	ITEM NO.
500 mm	SNY 15.0500
800 mm	SNY 15.0800
1200 mm	SNY 15.1200

6.2 Push-Lock Connections

6.2.1 Push-Lock Connections 10 mm

suitable for Clina flexible hoses 10

STRAIGHT CONNECTION WITH INSIDE SOCKET

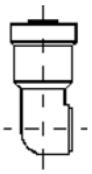
TECHNICAL DATA

DESCRIPTION	straight connection with inside socket for PP-pipe 20 x 2,00 mm, for inside socket welding
ITEM NO.	FGAI 20/10
PUSH-LOCK SYSTEM	10 mm
Ø OUTSIDE	20 mm
MATERIAL/COLOUR	PP-R/blue

SIDE CONNECTION WITH INSIDE SOCKET

TECHNICAL DATA

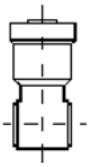
DESCRIPTION	side connection with inside socket for PP-pipe 20 x 2,00 mm, for inside socket welding
ITEM NO.	FSAI 20/10
PUSH-LOCK SYSTEM	10 mm
Ø OUTSIDE	20 mm
MATERIAL/COLOUR	PP-R/blue



MIDDLE CONNECTION WITH INSIDE SOCKET

TECHNICAL DATA

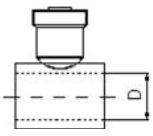
DESCRIPTION	middle connection with inside socket for PP-pipe 20 x 2,00 mm, for inside socket welding
ITEM NO.	FMAI 20/10
PUSH-LOCK SYSTEM	10 mm
Ø OUTSIDE	20 mm
MATERIAL/COLOUR	PP-R/blue



SOCKET CONNECTION

TECHNICAL DATA

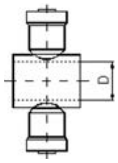
DESCRIPTION	socket connection for PP-pipe da = 20 mm, for heating element socket welding
ITEM NO.	FMA 20/10
PUSH-LOCK SYSTEM	10 mm
Ø OUTSIDE	20 mm
MATERIAL/COLOUR	PP-R/blue



DOUBLE SOCKET CONNECTION

TECHNICAL DATA

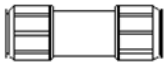
DESCRIPTION	double socket connection for PP-pipe da = 20 mm, for heating element socket welding
ITEM NO.	FMDA 20/10
PUSH-LOCK SYSTEM	10 mm
Ø OUTSIDE	20 mm
MATERIAL/COLOUR	PP-R/blue



PUSH-LOCK CONNECTION, STRAIGHT 10

TECHNICAL DATA

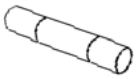
DESCRIPTION	push-lock connection straight 10 mm, suitable for Clina flexible hoses 10
ITEM NO.	FSVG 10
PUSH-LOCK SYSTEM	10 mm
Ø INSIDE	10 mm
LENGTH	45 mm
MATERIAL/COLOUR	plastic/white



DOUBLE NIPPLE 10

TECHNICAL DATA

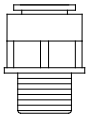
DESCRIPTION	double nipple 10 mm
ITEM NO.	FDON 10
PUSH-LOCK SYSTEM	10 mm
DN	8
Ø OUTSIDE	10 mm
LENGTH	45 mm
MATERIAL/SURFACE	nickel-plated brass



SCREW-IN CONNECTOR, STRAIGHT 10 X ½“ EXTERNAL SCREW THREAD

TECHNICAL DATA

DESCRIPTION	screw-in connector, straight 10 x 1/2" external screw thread, suitable for Clina flexible hoses 10
ITEM NO.	FSVAGM 10
PUSH-LOCK SYSTEM	10 mm
Ø INSIDE	10 mm
MATERIAL/SURFACE	brass

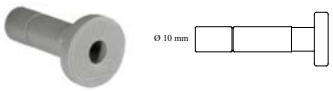


PRODUCT GROUP B

PLUG 10

TECHNICAL DATA

DESCRIPTION	plug 10 mm for closing push-lock connections 10 mm
ITEM NO.	FST 10
PUSH-LOCK SYSTEM	10 mm
Ø OUTSIDE	10 mm
MATERIAL/COLOUR	plastic/grey



6.2.2 Push-Lock Connections 15 mm

suitable for Clina flexible hoses 15

STRAIGHT CONNECTION WITH RETAINING RING

TECHNICAL DATA

DESCRIPTION	straight connection with retaining ring, with pipe connection for heating element socket welding, suitable for Clina flexible hoses 15
ITEM NO.	FGAS 20/15
PUSH-LOCK SYSTEM	15 mm
CONNECTOR Ø OUTSIDE	20 mm
MATERIAL/COLOUR	PP-R/blue

PUSH-LOCK CONNECTION 15

TECHNICAL DATA

DESCRIPTION	push-lock connection 15, suitable for Clina flexible hoses 15
ITEM NO.	FSVG 15
PUSH-LOCK SYSTEM	15 mm
Ø INSIDE	15 mm
LENGTH	60 mm
MATERIAL/COLOUR	plastic/white

DOUBLE NIPPLE 15

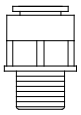
TECHNICAL DATA

DESCRIPTION	double nipple 15
ITEM NO.	FDON 15
PUSH-LOCK SYSTEM	15 mm
DN	13
Ø OUTSIDE	15 mm
LENGTH	65 mm
MATERIAL/SURFACE	nickel-plated brass

SCREW-IN CONNECTOR, STRAIGHT 15 X ½“ EXTERNAL SCREW THREAD

TECHNICAL DATA

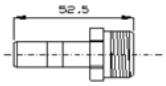
DESCRIPTION	screw-in connector, straight 15 x 1/2" external screw thread, suitable for Clina flexible hoses 15
ITEM NO.	FSVAGM 15
PUSH-LOCK SYSTEM	15 mm
Ø INSIDE	15 mm
MATERIAL/SURFACE	brass



TRANSITION NIPPLE EUROCONUS STRAIGHT

TECHNICAL DATA

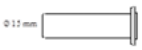
DESCRIPTION	transition nipple Euroconus straight, for pipe connections with clamp ring connection ¾" Euroconus
ITEM NO.	FSG 2015
PUSH-LOCK SYSTEM	15 mm
Ø OUTSIDE	15 mm
MATERIAL/SURFACE	nickel-plated brass



PLUG 15

TECHNICAL DATA

DESCRIPTION	plug 15 mm for closing push-lock connections 15 mm
ITEM NO.	FST 15
PUSH-LOCK SYSTEM	15 mm
Ø OUTSIDE	15 mm
MATERIAL/COLOUR	plastic/blue



FITTINGS

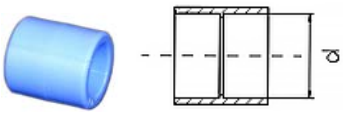
7 Fittings

7.1 Standard-Fittings

SOCKET

TECHNICAL DATA

DESCRIPTION	socket, for heating element socket welding, for connecting pipes or capillary tube mats/heating and cooling mats
Ø INSIDE	20 to 63 mm
MATERIAL/COLOUR	PP-R/blue

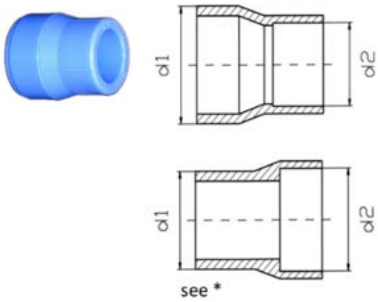


ITEM NO.	ADD-ON NO.	D	PU [PC.]
800	. 2000	20	1
	. 2500	25	1
	. 3200	32	1
	. 4000	40	1
	. 5000	50	1
	. 6300	63	1

REDUCING PIECE (I-O)

TECHNICAL DATA

DESCRIPTION	reducing piece inside/outside, for heating element socket welding, for connecting pipes or capillary tube mats/heating and cooling mats
Ø OUTSIDE D1	25 to 63 mm
Ø INSIDE D2	20 to 50 mm
MATERIAL/COLOUR	PP-R/blue



ITEM NO.	ADD-ON NO.	D1	D2	PU [PC.]
802	. 2502	25 *	20	1
	. 3201	32	20	1
	. 3202	32 *	25	1
	. 4001	40	20	1
	. 4002	40	25	1
	. 4003	40 *	32	1
	. 5001	50	20	1
	. 5002	50	25	1
	. 5003	50	32	1
	. 5004	50 *	40	1
	. 6301	63	25	1
	. 6302	63	32	1
	. 6303	63	40	1
	. 6304	63 *	50	1

TRANSITION PIECE WITH EXTERNAL HEXAGONAL BOLT

TECHNICAL DATA

DESCRIPTION	transition piece with male thread and hex head, for heating element socket welding
Ø INSIDE	20 to 63 mm
THREAD	1/2 to 2" male thread
MATERIAL/COLOUR	transition piece: PP-R/blue thread/hex head: brass

ITEM NO.	ADD-ON NO.	D	MALE THREAD	PU [PC.]
810	. 2001	20	½"	1
	. 2501	25	¾"	1
	. 3201	32	¾"	1
	. 3202	32	1"	1
	. 4001	40	1"	1
	. 4002	40	1¼"	1
	. 5001	50	1¼"	1
	. 5002	50	1½"	1
	. 6301	63	1½"	1
	. 6302	63	2"	1

TRANSITION COUPLING WITHOUT EXTERNAL HEXAGONAL

TECHNICAL DATA

DESCRIPTION	transition coupling, round, with male thread, without hex head, for heating element socket welding
Ø INSIDE	16 to 25 mm
THREAD	1/2 to 3/4" male thread
MATERIAL/COLOUR	transition coupling: PP-R/blue thread: brass

ITEM NO.	ADD-ON NO.	D	MALE THREAD	PU [PC.]
811	. 2001	20	½"	1
	. 2501	25	½"	1
	. 2502	25	¾"	1

PRODUCT GROUP B

TRANSITION SLEEVE

TECHNICAL DATA

DESCRIPTION	transition sleeve with female thread, with hex head, for heating element socket welding
Ø INSIDE	20 to 63 mm
THREAD	1/2 to 2" female thread
MATERIAL/COLOUR	transition sleeve: PP-R/blue thread/hex head: brass

ITEM NO.	ADD-ON NO.	D	FEMALE THREAD	PU [PC.]
816	. 2001	20	½"	1
	. 2501	25	¾"	1
	. 3201	32	¾"	1
	. 3202	32	1"	1
	. 4001	40	1"	1
	. 4002	40	1¼"	1
	. 5001	50	1½"	1
	. 6301	63	1½"	1
	. 6302	63	2"	1

TRANSITION SOCKET

TECHNICAL DATA

DESCRIPTION	transition socket, round, with female thread, without hex head, for heating element socket welding
Ø INSIDE	20 to 25 mm
THREAD	1/2 to 3/4" IG
MATERIAL/COLOUR	transition socket: PP-R/blue thread: brass

ITEM NO.	ADD-ON NO.	D	FEMALE THREAD	PU [PC.]
817	. 2001	20	½"	1
	. 2002	20	¾"	1
	. 2501	25	½"	1
	. 2502	25	¾"	1

90° ELBOW (I-I)

TECHNICAL DATA

DESCRIPTION	90° elbow female/female, for heating element socket welding
Ø INSIDE	20 to 63 mm
MATERIAL/COLOUR	PP-R/blue

ITEM NO.	ADD-ON NO.	D	PU [PC.]
820	. 2000	20	1
	. 2500	25	1
	. 3200	32	1
	. 4000	40	1
	. 5000	50	1
	. 6300	63	1

90° TRANSITION ELBOW MALE THREAD

TECHNICAL DATA

DESCRIPTION	90° transition elbow with male thread, from 1" with hex head, for heating element socket welding
Ø INSIDE	20 to 32 mm
THREAD	1/2 to 1" male thread
MATERIAL/COLOUR	transition elbow: PP-R/blue thread/hex head: brass

ITEM NO.	ADD-ON NO.	D	MALE THREAD	PU [PC.]
821	. 2001	20	½"	1
	. 2501	25	½"	1
	. 2502	25	¾"	1
	. 3201	32	¾"	1
	. 3202	32	1"	1

90° TRANSITION ELBOW FEMALE THREAD

TECHNICAL DATA

DESCRIPTION	90° transition elbow with female thread, from 1" with hex head, for heating element socket welding
Ø INSIDE	20 to 32 mm
THREAD	1/2 to 1" female thread
MATERIAL/COLOUR	transition elbow: PP-R/blue thread/hex head: brass

ITEM NO.	ADD-ON NO.	D	FEMALE THREAD	PU [PC.]
822	. 2001	20	½"	1
	. 2501	25	½"	1
	. 2502	25	¾"	1
	. 3201	32	¾"	1
	. 3202	32	1"	1

45° ELBOW (I-I)

TECHNICAL DATA

DESCRIPTION	45° elbow female/female, for heating element socket welding
Ø INSIDE	20 to 63 mm
MATERIAL/COLOUR	PP-R/blue

ITEM NO.	ADD-ON NO.	D	PU [PC.]
823	. 2000	20	1
	. 2500	25	1
	. 3200	32	1
	. 4000	40	1
	. 5000	50	1
	. 6300	63	1

PRODUCT GROUP B

45° ELBOW (I-O)

TECHNICAL DATA

DESCRIPTION	45° elbow female/male, for heating element socket welding
Ø INSIDE	20 to 32 mm
MATERIAL/COLOUR	PP-R/blue

ITEM NO.	ADD-ON NO.	D	PU [PC.]
824	. 2000	20	1
	. 2500	25	1
	. 3200	32	1

T-PIECE 90° EQUAL

TECHNICAL DATA

DESCRIPTION	T-piece 90° equal, for heating element socket welding, for connecting pipes or capillary tube mats/heating and cooling mats
Ø INSIDE	20 to 63 mm
MATERIAL/COLOUR	PP-R/blue

ITEM NO.	ADD-ON NO.	D	PU [PC.]
825	. 2000	20	1
	. 2500	25	1
	. 3200	32	1
	. 4000	40	1
	. 5000	50	1
	. 6300	63	1

90° ELBOW (I-O)

TECHNICAL DATA

DESCRIPTION	90° elbow female/male, for heating element socket welding
Ø INSIDE	20 to 40 mm
MATERIAL/COLOUR	PP-R/blue

ITEM NO.	ADD-ON NO.	D	PU [PC.]
826	. 2000	20	1
	. 2500	25	1
	. 3200	32	1
	. 4000	40	1

T-PIECE 90° REDUCED

TECHNICAL DATA

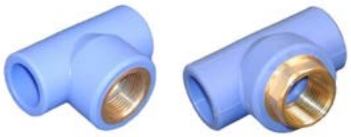
DESCRIPTION	T-piece 90° reduced, for heating element socket welding
Ø INSIDE D1	25 to 63 mm
Ø INSIDE D2	20 to 50 mm
Ø INSIDE D3	25 to 63 mm
MATERIAL/COLOUR	PP-R/blue

ITEM NO.	ADD-ON NO.	D1	D2	D3	PU [PC.]
830	. 2502	25	20	20	1
	. 2503	25	20	25	1
	. 3201	32	20	32	1
	. 3202	32	25	32	1
	. 4001	40	20	40	1
	. 4002	40	25	40	1
	. 4003	40	32	40	1
	. 5001	50	20	50	1
	. 5002	50	25	50	1
	. 5003	50	32	50	1
	. 5004	50	40	50	1
	. 6301	63	20	63	1
	. 6302	63	25	63	1
	. 6303	63	32	63	1
	. 6304	63	40	63	1
	. 6305	63	50	63	1

THREADED BRANCH TEE

TECHNICAL DATA

DESCRIPTION	threaded branch tee 90° with female thread, from 1" with hex head, for heating element socket welding
Ø INSIDE	20 to 40 mm
THREAD	1/2 to 1" female thread
MATERIAL/COLOUR	branch tee: PP-R/blue thread/hex head: brass



ITEM NO.	ADD-ON NO.	D1	FEMALE THREAD	PU [PC.]
832	. 2001	20	½"	1
	. 2501	25	½"	1
	. 2502	25	¾"	1
	. 3201	32	¾"	1
	. 3202	32	1"	1
	. 4001	40	¾"	1
	. 4002	40	1"	1

PRODUCT GROUP B

END CAP

TECHNICAL DATA

DESCRIPTION	end cap, for heating element socket welding, for closing pipes or capillary tube mats/heating and cooling mats
Ø INSIDE	20 to 63 mm
MATERIAL/COLOUR	PP-R/blue

ITEM NO.	ADD-ON NO.	D	PU [PC.]
845	. 2000	20	1
	. 2500	25	1
	. 3200	32	1
	. 4000	40	1
	. 5000	50	1
	. 6300	63	1

TRANSITION SCREW MALE

TECHNICAL DATA

DESCRIPTION	transition screw with male thread and hex head, for heating element socket welding
Ø	20 to 63 mm
THREAD	1/2 to 2" male thread
MATERIAL/COLOUR	pipe end: PP-R/blue thread/hex head: brass

ITEM NO.	ADD-ON NO.	D	MALE THREAD	PU [PC.]
861	. 2000	20	½"	1
	. 2500	25	¾"	1
	. 3200	32	1"	1
	. 4000	40	1¼"	1
	. 5000	50	1½"	1
	. 6300	63	2"	1

PP-SOCKET BALL VALVE

TECHNICAL DATA

DESCRIPTION	PP-socket ball valve, to shut off, for heating element socket welding
Ø INSIDE	20 to 63 mm
MATERIAL/COLOUR	PP-R/blue or green

ITEM NO.	ADD-ON NO.	D	L/H	PU [PC.]
870	. 2000	20	on request	1
	. 2500	25	on request	1
	. 3200	32	on request	1
	. 4000	40	on request	1
	. 5000	50	on request	1
	. 6300	63	on request	1

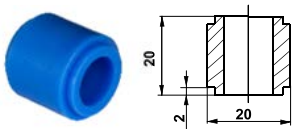
7.2 Special-Fittings

Clina Fittings are made of high-quality polypropylene (PP-R) like the capillary tube mats for heating and cooling. All fittings are DVGW - registered and standardised to DIN 16962.

INSIDE SOCKET

TECHNICAL DATA

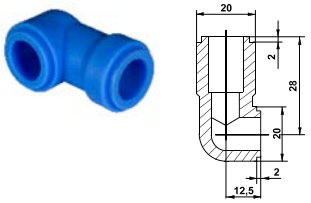
DESCRIPTION	inside socket for heating element inside socket welding
ITEM NO.	FI 20
Ø OUTSIDE	20 mm
MATERIAL/COLOUR	PP-R/blue



90° ELBOW WITH INSIDE SOCKET

TECHNICAL DATA

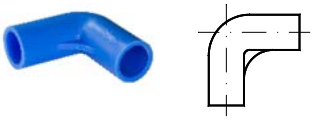
DESCRIPTION	90° elbow with inside socket for heating element inside socket welding
ITEM NO.	FWI 9020
Ø OUTSIDE	20 mm
MATERIAL/COLOUR	PP-R/blue



90° ELBOW HS

TECHNICAL DATA

DESCRIPTION	90° elbow for butt-welding
ITEM NO.	FWS 9020
Ø OUTSIDE	20 mm
MATERIAL/COLOUR	PP-R/blue



END CAP WITH GRIP

TECHNICAL DATA

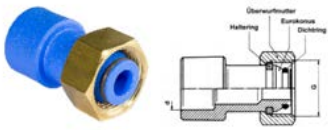
DESCRIPTION	end cap for butt welding, with grip, for closing pipes or capillary tube mats/heating and cooling mats
ITEM NO.	FESG 20
Ø OUTSIDE	20 mm
MATERIAL/COLOUR	PP-R/blue

PRODUCT GROUP B

VALVE CONNECTION

TECHNICAL DATA

DESCRIPTION	valve connection, socket end for heating element socket welding, 20 x 3/4 inside thread Euroconus
ITEM NO.	FVM 20
Ø OUTSIDE	20 mm
MATERIAL/COLOUR/ SURFACE	socket end: PP-R/blue union nut (Überwurfmutter): nickel-plated brass



MEASUREMENT & CONTROL TECHNOLOGY

PRODUCT GROUP B

8 Measurement & Control Technology

8.1 Room Temperature Controller

Clina Room Temperature Controllers are equipped with a connection for Clina Dew Point Sensors. The actual operating mode (cooling/heating/ danger of dew point) is indicated by light-emitting diodes.

The room temperature is upheld by means of a simple 2-point-control mode (ON/OFF). By way of the room temperature controller, the temperature is recorded, and by a control signal the zone valve with actuator is activated. As a result of the low level water content and the spreading of 2-4 K, a constant control is not necessary. This type of room temperature control is preferentially applied for cooling and also heating purposes with the capillary tube system.

The Clina Room Temperature Controller TR1 B, TR2/3 and TR2/3 F is designed for temperature control of the room as well as for the protection of the cooling ceiling against damage resulting from condensation.

Room Temperature Controller Heating and Cooling

TECHNICAL DATA ROOM TEMPERATURE CONTROLLER HEATING AND COOLING

	TR1B	TR2/3	TR2/3F
DIMENSIONS:	78 x 83 x 25 mm	70 x 70 x 20 mm	81 x 85 x 16 mm
OPERATING VOLTAGE:	24 VAC/50 Hz, 24 VDC	24 VAC/50 Hz	24 VAC/50 Hz, 24 VDC
CONTROL RANGE:	13–29 °C	5–30 °C	13–29 °C
SWITCHING HYSTERESIS:	approx. 1 K	1 K	approx. 1 K
TEMPERATURE SENSOR:	internal NTC	internal NTC	internal NTC
SWITCHING OUTPUTS:	24 VAC/50 Hz, 24 VDC	TRIAC, 24 VAC/1 A	24 VAC/50 HZ, 24 VDC
HOUSING COLOUR:	alpine-white equal RAL 9010	signal white equal RAL 9003	alpine-white gloss equal RAL 9010
FUNCTIONS:	cooling or heating with switchover ECO-function	a) cooling or heating b) cooling and heating with set point remote adjustment	a) cooling or heating b) cooling and heating with set point remote adjustment
INSTALLATION:	on-wall mounting	in-wall mounting suitable for in-wall socket in accordance to DIN 49073 (mounting depth 28 mm)	in-wall mounting suitable for in-wall socket in accordance to DIN 49073 (mounting depth 28 mm)

ROOM TEMPERATURE CONTROLLER TR1B

The controller TR1B (on-wall mounting) has an exit to actuate a valve and is switchable between heating **or** cooling.

TECHNICAL DATA

DESCRIPTION	room temperature controller heating **or** cooling, on-wall mounting 24 VAC/50 Hz, 24 VDC
ITEM NO.	TR1B

ROOM TEMPERATURE CONTROLLER TR2/3

The controller TR2/3 (in-wall mounting) can actuate 1 valve (heating or cooling) and can also be switched internally to actuate 2 valves (heating **and** cooling). With the option of the external set point remote adjustment ± 5 K through a signal 0-10 V, the TR2/3 is used for two-pipe systems (heating **or** cooling) and four-pipe systems (heating **and** cooling).

TECHNICAL DATA

DESCRIPTION	room temperature controller heating **and/or** cooling, in-wall mounting 24 VAC/50 Hz
ITEM NO.	TR2/3

ROOM TEMPERATURE CONTROLLER TR2/3F

The controller TR2/3F (in-wall mounting) for the integration in existing switch programs can actuate 1 valve (heating **or** cooling) and also be switched internally to actuate 2 valves (heating **and** cooling). An external set point remote adjustment of -3 K in case of heating and +3 K in case of cooling is possible.

TECHNICAL DATA

DESCRIPTION	room temperature controller heating **and/or** cooling, in wall mounting 24 VAC/50 Hz, 24 VDC housing cover 50 x 50 mm with frame also for integration in different switch programs with adapter frames
ITEM NO.	TR2/3F*

HOUSING COVER VARIANT 55 X 55

TECHNICAL DATA

DESCRIPTION	housing cover 55 x 55 mm for controller TR2/3F RAL 9010 gloss also for direct integration in different switch programs without adapter frames
ITEM NO.	VA55*

COVER FRAME

TECHNICAL DATA

DESCRIPTION	cover frame for controller TR2/3 for flush mounted sockets Ø >65mm
ITEM NO.	VRR2/3

* Chart for selection and assignment of the controller to the various frame programs based on the size of the cover frame available on request.

Other types of the a.m. room temperature controllers on request (e.g., room temperature controller heating and cooling on-wall mounting or room temperature controller heating and/or cooling, in-wall mounting TR2/3 as well as TR2/3F with LCD display)!

PRODUCT GROUP B

Room Temperature Controller Heating

TECHNICAL DATA ROOM TEMPERATURE CONTROLLER HEATING

	TR24B/AP	TR230B/AP	TR24B/UP	TR230B/UP
DIMENSIONS:	78 x 83 x 15 mm	78 x 83 x 15 mm	81 x 85 x 16 mm	81 x 85 x 16 mm
OPERATING VOLTAGE:	24 VAC/50 Hz	230 VAC/50 Hz	24 VAC/50 Hz, 24 VDC	230 VAC/50 Hz
AVERAGE POWER INPUT:	<0,25 W	<0,25 W	<0,5 W	<0,5 W
CONTROL RANGE:	5–30 °C	5–30 °C	5–30 °C	5–30 °C
SENSOR:	bi-metal	bi-metal	bi-metal	bi-metal
SWITCHING HYSTERESIS:	approx. 1 K	approx. 1 K	approx. 1 K	approx. 1 K
MAX. SWITCHING VOLTAGE:	24 VAC/50 Hz	230 VAC/ 50 Hz	24 VAC/50 Hz, 24 VDC	230 VAC/50 Hz
HOUSING COLOUR:	alpine-white equal RAL 9010	alpine-white equal RAL 9010	alpine-white equal RAL 9010	alpine-white equal RAL 9010
FUNCTIONS:	heating	heating	heating	heating
INSTALLATION:	on-wall mounting	on-wall mounting	in-wall mounting suitable for flush mounted sockets in accordance to DIN 49073 (mounting depth 28 mm)	in-wall mounting suitable for flush mounted sockets in accordance to DIN 49073 (mounting depth 28 mm)

ROOM TEMPERATURE CONTROLLER TR24B/AP

TECHNICAL DATA

DESCRIPTION	room temperature controller heating, 24 VAC/50 Hz alpine-white, equal RAL 9010, on-wall mounting
ITEM NO.	TR24B/AP

ROOM TEMPERATURE CONTROLLER TR24B/UP

TECHNICAL DATA

DESCRIPTION	room temperature controller heating, 24 VAC/50 Hz alpine-white, gloss, equal RAL 9010, in-wall mounting
ITEM NO.	TR24B/UP

ROOM TEMPERATURE CONTROLLER TR230B/AP

TECHNICAL DATA

DESCRIPTION	room temperature controller heating, 230 VAC/50 Hz alpine-white, equal RAL 9010, on-wall mounting
ITEM NO.	TR230B/AP

ROOM TEMPERATURE CONTROLLER TR230B/UP

TECHNICAL DATA

DESCRIPTION	room temperature controller heating, 230 VAC/50 Hz alpine-white, gloss, equal RAL 9010, in-wall mounting
ITEM NO.	TR230B/UP

PRODUCT GROUP B

8.2 Dew Point Sensor

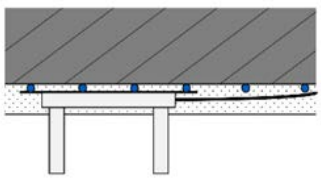
Clina Dew Point Sensors register any possible accumulation of condensation at the capillary tube mat or in its immediate surroundings, thereby changing their electric resistance. This resistance change in the sensor is recognised by the room temperature controller TR1 and TR2/3 and causes the control valve to close. It therefore protects the cooling surfaces effectively against damage.

DEW POINT SENSOR TF 3 P/R-14

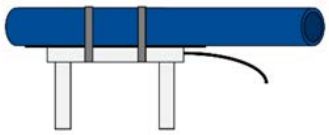
for plaster ceilings as well as for piping

TECHNICAL DATA	
DESCRIPTION	dew point sensor for plaster ceilings and piping, 24 VDC, 24 VAC/50 Hz
ITEM NO.	TF3 P/R-14
DIMENSIONS	70 x 20 x 7 mm (sensor with housing)
CONNECTING CABLE	2-core cable length 10 m, 2 x 0,14 m² (extendable up to approx. 50 m with shielded cable
OPERATING VOLTAGE	24 VDC, 24 VAC/50 Hz
ALLOWED AMBIENT TEMPERATURE	0...50 °C
SWITCHING POINT FOR DEW POINT	approx. 8 MΩ, corresponds to approx. 95% rel. humidity
MATERIAL	housing: plastic, circuit board: gold plated

dew point sensor TF3 P/R -14



mounting in plaster ceiling



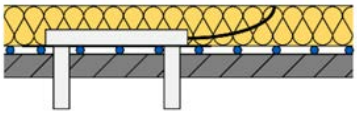
mounting on pipe

DEW POINT SENSOR TF 3 G/M-14

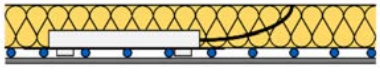
for gypsum board and metal panel ceilings

TECHNICAL DATA	
DESCRIPTION	dew point sensor for gypsum board or metal panel ceilings, 24 VDC, VAC/50 Hz
ITEM NO.	TF3 P/R-14
DIMENSIONS	70 x 20 x 7 mm (sensor with housing)
CONNECTING CABLE	2-core cable length 10 m, 2 x 0,14 m² (extendable up to approx. 50 m with shielded cable
OPERATING VOLTAGE	24 VDC, 24 VAC/50 Hz
ALLOWED AMBIENT TEMPERATURE	0...50 °C
SWITCHING POINT FOR DEW POINT	approx. 8 MΩ, corresponds to approx. 95% rel. humidity
MATERIAL	housing: plastic, circuit board: gold plated

dew point sensor TF3 G/M-14



mounting in gypsum board ceiling



mounting in metal panel

8.3 Converter

The Clina Converter TK1-PF or TK2-PF evaluates the information from the allocated dew point sensor. On reaching the dew point, the integrated contact (voltage free change-over contact) is actuated. This information can, for example, be of service to the remote signal of a GLT on the customer´s side, or similar. Up to 5 dew point sensors (5 pieces parallel) can be hooked up to a converter. The converter is among others intended for the installation on electric installation rails (standard rails).

CONVERTER TK1-PF

TECHNICAL DATA

DESCRIPTION	converter 24 VDC, 24 VAC/50 Hz volt free changeover contact
ITEM NO.	TK1-PF
MAX. CAPACITY OF THE OUTLET	48 VAC, 60 VDC
DIMENSIONS	86 x 36 x 59 mm

CONVERTER TK2-PF

TECHNICAL DATA

DESCRIPTION	converter 230 VAC/50 Hz volt free changeover contact
ITEM NO.	TK2-PF
MAX. CAPACITY OF THE OUTLET	230 VAC
DIMENSIONS	86 x 36 x 59 mm

PRODUCT GROUP B

8.4 Thermal Actuator

This thermal actuator is matching to zone valves and provides a two-point (OPEN/CLOSE) control for heating and air-conditioning systems. The thermal actuator keeps the valve shut in a de-energised state; it is equipped with a “First-Open” function and a function indicator. The thermal actuator is plugged on to a valve adapter (VA1) via bayonet closure. If requested by the customer, it can be supplied with an auxiliary switch for ON/OFF control of the circulating pump.

OPERATING VOLTAGE:	24 VAC or 230 VAC ± 10%, 50-60 Hz
OPERATING POWER:	1 Watt
AMBIENT TEMPERATURE:	max. 60 °C
CLOSING AND OPENING TIME:	approx. 3,5 min
ACTUATOR TRAVEL:	4,0 mm
ACTUATING FORCE:	100 N
DEGREE / CLASS OF PROTECTION:	IP54 / II
CONNECTING LINE:	2 x 0,75 mm² PVC (L = 1000 mm)
COLOUR:	light grey (RAL 7035)
DIMENSIONS H X W X D:	(50,5 + 5) x 44 x 48 mm
CE CONFORMITY ACCORDING TO:	EN 60730

THERMAL ACTUATOR TA24 (24 VAC)

TECHNICAL DATA

DESCRIPTION	thermal actuator 24 VAC, normally closed (NC), 1 watt, bayonet closure, 4,0 mm-travel path, "first open" function, WITHOUT adapter for valve body (to be ordered separately)
ITEM NO.	TA24

*Other actuator types e.g., with a control voltage 0-10 VDC, are available on request.

THERMAL ACTUATOR TA230 (230 VAC)

TECHNICAL DATA

DESCRIPTION	thermal actuator 230 VAC, normally closed (NC), 1 watt, bayonet closure, 4,0 mm-travel path, "first open" function, WITHOUT adapter for valve body (to be ordered separately)
ITEM NO.	TA230

*Other actuator types e.g., with a control voltage 0-10 VDC, are available on request.

ADAPTER

TECHNICAL DATA

DESCRIPTION	adapter M30 x 1,5 for a.m. actuators suitable for Oventrop, Heimeier, SBK
ITEM NO.	VA1

*Adapters to attach the actuator to other valve bodies are also available on request.

SYSTEM SEPERATION & PLASTIC MANIFOLD

9 Separation System & Plastic Manifold

9.1 SEPARATION SYSTEMS

The system solutions offered by Clina use PP capillary tube mats and PP pipes which are oxygen-diffusion-open. Since the presence of oxygen leads to corrosion, it is essential to design the secondary circuit with corrosion-resistant materials. This also applies to the circulation pump. We recommend the use of plastics, stainless steel, bronze, red bronze or copper. Of course, the offered assembly does meet these requirements.

Until the saturation limit is reached, oxygen, not to be confused with air, enters the system. Due to the oxygen diffusion through the PP, a system separation is implemented using a stainless steel plate heat exchanger.

This ensures a complete and thus a material separation of the primary and secondary circuit. In order to reliably protect the Clina system from dirt and corrosion, we recommend using our separation systems.

Clina offers separation systems with performances of 3,5 to approx. 50 KW. These separation systems mainly consist of the following components:

- controlled bronze or stainless steel circulating pump
- stainless steel - plate heat exchanger
- constant flow temperature control
- safety valve
- over-temperature-protection device
- membrane safety valve
- membrane expansion tank with connecting-kit

The entire station is built on a stable, galvanized mounting frame and prior to delivery it is subjected to a leak test with 10 bar water pressure.

PRODUCT GROUP B

TECHNICAL DATA

ITEM NO.	PERFOR-MANCE KW	WT TYPE	TEMP. °C PRIM. F/RF	TEMP. °C SEC. F/RF	PRESSURE LOSS HE SEC. KPA	PUMP PRIMARY	PUMP SECONDARY	CONNECTIONS PRIMARY	CONNECTIONS SECONDARY	WIDTH* mm	HEIGHT * mm	DEPTH * mm
TS-MINI 3,5	3,5	GBS 220H - 14	50/40	35/30	<10	-	UPM3 15-70	1/2" male thread	3/4" male thread	415 407	450 550	150 265
TS-MINI 5,0	5	SWEP / GBS 220H - 20	50/40	35/30	<10	-	UPS-15-40 CIL/ UPM3 15-70	1/2" male thread	3/4" male thread	407	550	265
TS8-ECO	8	GBS 300H - 24	45/35	34/30	< 10	-	Grundfos UPM3 15-70	1" female thread	1 1/4" female thread	480	820	345
TS10-ECO	10	GBS 300H - 30	45/35	34/30	< 10	-	Wilo Stratos PARA Z25/1-8	1" female thread	1 1/4" female thread	480	820	345
TS15-ECO	15	GBS 300H - 40	45/35	34/30	< 10	-	Wilo Stratos PARA Z25/1-8	1" female thread	1 1/2" female thread	560	820	345
TS20-ECO	20	GBS 300H - 50	45/35	34/30	< 10	-	Wilo Stratos PARA Z30/1-12	1" female thread	1 1/2" female thread	560	820	345
TS30-ECO	30	GBS 300H - 50	45/37	35/30	< 10	-	Wilo Stratos PARA Z30/1-12	1 1/4" female thread	2" female thread	650	820	345
TS35-ECO	35	GBS 300H - 80	45/36	35/31	< 10	-	Wilo Stratos PARA Z30/1-12	1 1/4" female thread	2" female thread	650	820	345
TP8-ECO	8	GBS 300H - 24	45/35	34/30	< 10	Wilo Para 15/1-7	Grundfos UPM3 15-70	1" female thread	1 1/4" female thread	480	820	345
TP10-ECO	10	GBS 300H - 30	45/35	34/30	< 10	Wilo Para 15/1-7	Wilo Stratos PARA Z25/1-8	1" female thread	1 1/4" female thread	480	820	345
TP15-ECO	15	GBS 300H - 40	45/35	34/30	< 10	Wilo Para 15/1-7	Wilo Stratos PARA Z25/1-8	1" female thread	1 1/2" female thread	560	820	345
TP20-ECO	20	GBS 300H - 50	45/35	34/30	< 10	Wilo Para 15/1-7	Wilo Stratos PARA Z30/1-12	1" female thread	1 1/2" female thread	560	820	345
TP30-ECO	30	GBS 300H - 50	45/37	35/30	< 10	Wilo Stratos Para 25/1-8	Wilo Stratos PARA Z30/1-12	1 1/4" female thread	2" female thread	650	820	345
TP35-ECO	35	GBS 300H - 80	45/36	35/31	< 10	Wilo Stratos Para 25/1-8	Wilo Stratos PARA Z30/1-12	1 1/4" female thread	2" female thread	650	820	345

* Housing dimensions, plus the external screw connections

* The expansion tank, which is connected via a flexible hose, is located outside the housing and not taken into account regarding its dimensions.

PRODUCT GROUP B

Separation system heating consist of:

heat exchanger, high efficiency circulating pump, safety devices, expansion tank, constant temperature control, etc. to separate the corrosion resistant secondary heating/cooling circuit from the primary circuit; design: white housing on assembly frame

SEPARATION SYSTEM WITH HIGH EFFICIENCY PUMP ON THE SECONDARY SIDE, WITHOUT HOUSING

TECHNICAL DATA

ITEM NO.	PERFORMANCE KW
TS Mini 3,5	3,5
TS Mini 5,0	5,0

SEPARATION SYSTEM WITH HIGH EFFICIENCY PUMP ON THE SECONDARY SIDE, WITH HOUSING

TECHNICAL DATA

ITEM NO.	PERFORMANCE KW
TS8 - Eco	8,0
TS10 - Eco	10,0
TS15 - Eco	15,0
TS20 - Eco	20,0
TS30 - Eco	30,0
TS35 - Eco	35,0

SEPARATION SYSTEM WITH HIGH EFFICIENCY PUMP ON THE SECONDARY AND THE PRIMARY SIDE, WITH HOUSING

TECHNICAL DATA

ITEM NO.	PERFORMANCE KW
TP8 - Eco	8,0
TP10 - Eco	10,0
TP15 - Eco	15,0
TP20 - Eco	20,0
TP30 - Eco	30,0
TP35 - Eco	35,0

We deliver Separation Systems customized for your project!

Therefore, we need the following information:

- total operating performance of the station/system in KW
- system temperatures of the primary and secondary side
- the maximum pressure loss on the primary side
- the required head of the pump on the secondary side
- a sketch if necessary
- max. possible installation dimensions

9.2 Plastic Manifold

Clina Plastic Manifolds have the task to distribute the water flows of the secondary circuit to the different zones according to the specifications. This way the hydraulic balancing as well as the single room regulation is realized via the electro-thermal actuators (2-point control) controlled by the room regulators.

- plastic manifolds (-20 °C to + 90 °C) with integrated air chambers for thermal insulation in the colours red and blue
- flow unit with integrated shut-off device, can be changed and equipped with an actuator
- return flow unit with integrated, adjustable flow meter, protecting cap with eyelet seal
- manifold connection unit with 1½" male thread and 1" female thread and four additional ½" bore holes for e.g., deaerator, feed and vent cock, thermometer; the manifold connection is possible from the right or the left side
- outlet screw connections of the separate circuits, ¾" male thread Euroconus for plastic, copper/soft steel or multi-layer composite pipes

PLASTIC MANIFOLD

TECHNICAL DATA

DESCRIPTION	ITEM NO.
2 -fold flow manifold and return flow collector, pre-installed flow meter yellow 1,7 - 7,8 l/min (100 - 465 l/h)	KVT02
3-fold, analogue as above mentioned	KVT03
4-fold, analogue as above mentioned	KVT04
5-fold, analogue as above mentioned	KVT05
6-fold, analogue as above mentioned	KVT06
7-fold, analogue as above mentioned	KVT07
8-fold, analogue as above mentioned	KVT08
9-fold, analogue as above mentioned	KVT09
10-fold, analogue as above mentioned	KVT10
11-fold, analogue as above mentioned	KVT11
12-fold, analogue as above mentioned	KVT12

MANIFOLD CONNECTION KIT

TECHNICAL DATA

DESCRIPTION	manifold connection kit incl. 2 manual air vent valves 1/2", 2 plugs 1/2", 2 feed and vent valves 1/2", 2 thermometer with immersion sleeve 1/2", 1 sheet self-adhesive label
ITEM NO.	KVAG

BALL VELVE WITH HEXAGON SOCKET SPANNER

TECHNICAL DATA

DESCRIPTION	ball valve 1 1/2" screwcap x 1" female thread with hexagon socket spanner size 5 mm and spanner
ITEM NO.	KVKHI

PRODUCT GROUP B

BALL VELVE WITH LOCKING HANDLE

TECHNICAL DATA

DESCRIPTION	ball valve 1 1/2" screwcap x 1" female thread with locking handle, "heavy design"
ITEM NO.	KVKHK

UNIVERSAL WALL HOLDER

TECHNICAL DATA

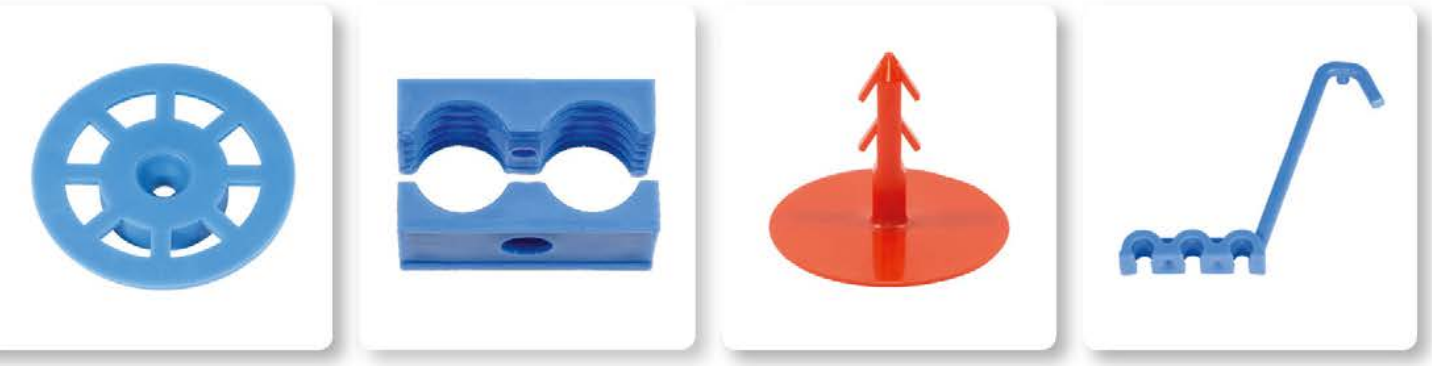
DESCRIPTION	universal wall holder 103-105 mm high, incl. installation kit (2 wall holders with mounting material)
ITEM NO.	KVWH

COMPRESSION FITTING

TECHNICAL DATA

DESCRIPTION	compression fitting 3/4" with Euroconus for PP-pipe 20 x 2,0 mm (1 pair)
ITEM NO.	KVKRV20

FIXING MATERIAL



10 Fixing Material

10.1 ADHESIVE

The Clina Adhesive is used for the attachment of Clina Capillary Tube Mats in metal ceiling elements. The processing can be made with a customary short pile paint roller.

TECHNICAL DATA

DESCRIPTION	adhesive
ITEM NO.	VKD 10
CONTENT	10 kg
PROCESSING TEMPERATURE	15-25 °C
TRANSPORT/STORAGE TEMPERATURE	not below 5 °C, sensitive to frost, pay attention to date of minimum durability (unopened)
APPLICATION	on the capillary tube mat, apply only on one side
DELUTION	not necessary, possible with water
CLEANING (TOOLS)	with water
COVERAGE	approx. 30-50 g/m² capillary tube mat

Processing instruction: The Clina Adhesive VKD 10 has to be applied undiluted.

10.2 OMEGA RIBBON/DISTANCE PIECE

Clina distance pieces, also called Omega ribbons, are components of each Clina capillary tube mat. They have the function to hold the capillary tubes in a defined distance.

TECHNICAL DATA

DESCRIPTION	Omega ribbon, distance piece for capillary tubes
ITEM NO.	VAB 10 and VABB 10
AVAILABLE FOR CAPILLARY TUBES	3,4 x 0,55 mm and 4,3 x 0,8 mm
LENGTH	1000 mm
CENTRE-TO-CENTRE DISTANCE FOR CAPILLARY TUBES	10 mm
MATERIAL/COLOUR	plastic/blue

10.3 DOUBLE CLAMP

A special double pipe clamp for the Clina capillary tube mat type S and SB (mat distributor pipe 20 x 2,0 mm). The double clamp has the function to fix the mat distributor pipes in place. Afterwards, the mat can be tightened and installed further. Of course, this clamp also can be used to fix DN 15 pipes.

TECHNICAL DATA

DESCRIPTION	double clamp, for fixing the mat distributor pipes to the subsurface, especially suitable for Clina capillary tube mats type S and SB and for pipes Ø outside = 20 mm
ITEM NO.	FDS 20
Ø INSIDE	20 mm
MATERIAL/COLOUR	plastic/blue

10.4 PIPE BEND HOLDER

Plastic pipe bend holder for fixation of PP-pipe 20 x 2,0 mm in 90° angel. Very long pipe guide, whereby a clean and a flow favourable 90° angel is reached. The permissible bending radius 5 x D is kept and is not exceeded when inserting the pipe (no buckling risk for the pipe).

TECHNICAL DATA

DESCRIPTION	pipe bend holder, for fixation of PP-pipe 20 x 2,0 mm in 90° angle
ITEM NO.	VRBH 20
LEG LENGTH	150 mm
MATERIAL/COLOUR	plastic/black

10.5 PLASTIC NAIL

Plastic nail suitable for the fixation of the capillary tube mats to the wall, the ceiling or the floor.

TECHNICAL DATA

DESCRIPTION	plastic nail
ITEM NO.	VKN 30
PACKAGING UNIT	100 pieces
DISK DIAMETER	35 mm
SHAFT LENGTH	30 mm
BORE DIAMETER	5 mm
MATERIAL/COLOUR	plastic/red

10.6 CLINA OPTIFIX

Plastic disc suitable for the fixation of the capillary tube mats to the wall, the ceiling or the floor (e.g., by means of a powder-actuated tool). Clina OptiFix can be fixed mechanically with a steel nail on all common concrete qualities.

TECHNICAL DATA

DESCRIPTION	Clina OptiFix
ITEM NO.	VOF
PACKAGING UNIT	100 pieces
DISC DIAMETER	40 mm
HEIGHT	7 mm
BORE DIAMETER	4 mm
MATERIAL/COLOUR	plastic/blue

10.7 PLASTIC PIPE HOOK

Plastic pipe hook to fix the pipe of the capillary tube mat or other pipes to the wall, the ceiling or the floor.

TECHNICAL DATA

DESCRIPTION	plastic pipe hook	
ITEM NO.	VDH 60	VDH 80
PACKAGING UNIT	50 pieces	50 pieces
MAX. PIPE DIAMETER	32 mm	32 mm
SHAFT LENGTH	60 mm	80 mm
BORE DIAMETER	80 mm	80 mm
MATERIAL/COLOUR	plastic/black	plastic/black

10.8 PLASTIC CLIPRAIL

Plastic cliprail to fix a pipe.

TECHNICAL DATA

DESCRIPTION	plastic cliprail for fixing pipes with 20 mm outside Ø
ITEM NO.	VRK
LENGTH	2 m
WIDTH	40 mm
HEIGHT	25 mm
CENTRE-TO-CENTRE DISTANCE BETWEEN PIPES	25 mm
MATERIAL/COLOUR	plastic/grey

10.9 RETAINING CLIP

Plastic retaining clip to hook the capillary tube mats in between the profiles of the supporting construction of a gypsum board ceiling.

TECHNICAL DATA

DESCRIPTION	retaining clip
ITEM NO.	VHC
PACKAGING UNIT	200 pieces
MATERIAL/COLOUR	plastic/blue

10.10 RETAINER

Sheet metal retainer to hook the capillary tube mats in between the profiles of the supporting construction of a gypsum plate ceiling.

TECHNICAL DATA

DESCRIPTION	retainer		
ITEM NO.	VBH 300	VBH 400	VBH 480
LENGTH	300 (250) mm	400 (350) mm	480 (400) mm
WIDTH	30 mm	30 mm	30 mm
HEIGHT	30 mm	30 mm	30 mm
MATERIAL	sheet metal	sheet metal	sheet metal

TOOLS & ASSEMBLY KIT

11 Tools & Assembly Kit

The following tool assortment must be readily available on all construction sites for professional installation of the Clina mats and the PP-tube installation. Further special tools are available on request.

11.1 PLIERS FOR CUTTING PLASTIC

TECHNICAL DATA

DESCRIPTION	pliers for cutting plastic
ITEM NO.	WS 20
PIPE - Ø	20-32 mm

11.2 QUICK RELEASE PLIERS Ø 10 MM

TECHNICAL DATA

DESCRIPTION	quick release pliers Ø 10 mm for removing the flexible hose DN 10 from the push-lock connection
ITEM NO.	WKLZ

11.3 BUTT-WELDING DEVICE

TECHNICAL DATA

DESCRIPTION	butt-welding device
ITEM NO.	WSS 1
WELDING MIRROR - Ø	90 mm
OPERATING VOLTAGE	240 V
THERMOSTAT CONTROL	240 V
ELECTRICAL VOLTAGE	600 W

11.4 DEVICE FOR HEATING ELEMENT SOCKET WELDING

TECHNICAL DATA

DESCRIPTION	device for heating element socket welding incl. work bench holder
ITEM NO.	WMS 2
OPERATING VOLTAGE	240 VAC
ELECTRICAL VOLTAGE	800 W

The tools for heating element socket welding of the different pipe dimensions must be ordered separately (see 11.5 on page 107).

PRODUCT GROUP C

11.5 TOOLS FOR HEATING ELEMENT SOCKET WELDING

TECHNICAL DATA

DESCRIPTION	tools for **inside socket welding**
ITEM NO.	WSM-I 16
TYPE	inside socket welding
PIPE - Ø	16

DESCRIPTION	tools for **outside socket welding**					
ITEM NO.	WSM 20	WSM 25	WSM 32	WSM 40	WSM 50	WSM 63
TYPE	outside SW*	outside SW*	outside SW*	outside SW*	outside SW*	outside SW*
PIPE - Ø	20	25	32	40	50	63

*SW = socket welding

12 Zero Risk for Builders and Plant Engineers

The 15-year warranty for Clina Heating and Cooling Mats is not only a binding commitment on behalf of Clina but also fully covered by a renowned insurance company.

Any damages are thus settled independent of the economic situation of Clina.

Declaration of Warranty 2021

Our **Clina** heating and cooling mats are made of high-quality plastic and manufactured on modern production facilities. By means of the strict quality control of our products and with the backing of a leading insurance company we grant the following

15-year warranty

upon proper installation and as of the date of production:

1. Replacement of **Clina** heating and cooling mats in case of material defects
   - unlimited - by means of delivering defect-free merchandise.

2. Compensation for damages to persons and property upon proof of defect **Clina** heating and cooling mats:
   - 5 million € - per event of damage, maximum 10 million € per year.

3. Compensation for expenses incurred during the dismantling and/or uncovering of the defect Clina heating and cooling mats and installation of defect-free Clina heating and cooling mats:
   - 1,5 million € - per event of damage, maximum 3 million € per year.

Exclusion of liability in case of
- improper installation,
- use for unintended purposes,
- application of components not purchased from us or recommended by us.

This extended warranty for Clina Heating and Cooling Mats is valid worldwide with the exception of the USA and Canada.

Clina Heiz- und Kühlelemente GmbH
Eichhorster Weg 80
13435 Berlin
Germany
Fon: +49 30 40 20 54 -0
Fax: +49 30 40 20 54 -19

13 Standard Terms of Business

1. Area of Application

The following terms of contract apply to all current and future contracts concluded by Clina Heiz- und Kühlelemente GmbH (hereinafter referred to as **Clina**) and its contract partners (hereinafter referred to as the **customer**), to the extent that the latter is exercising his/her/its commercial or self-employed professional activities (a business in the sense of section § 14 of BGB [German Civil Code]).
Other standard terms of business deviating from, conflicting with or supplementing these terms of contract shall only apply as effectively agreed on if Clina explicitly consents to this in writing.

2. Scope of Delivery, Delivery Dates

Subject to correct and punctual delivery to ourselves.
In cases of orders for bulk goods deviations customary to the trade apply.
Delays in delivery due to disturbances in the business operations for which Clina is not answerable, or due to the direct prior suppliers, particularly as a result of strike or lockouts or to cases of force majeure, prolong the delivery period.
Four weeks after the exceeding of a non-binding delivery date or a non-binding de-livery deadline the customer can demand in writing that Clina delivers within an ap-propriate period. With this reminder Clina comes into default.

3. Prices, Terms of Payment

3.1 Unless some other agreement has been reached, prices include packaging and apply ex works, with the statutory VAT still to be added.

In the event of a net order value of less than EUR 50 Clina charges an additional pro-cessing fee to the value of EUR 7.50 (plus VAT).

3.2 Unless some other agreement has been reached, payments are to be made without deduction and within 30 days as from the invoice date. In cases of receipt of payment within 14 days of the invoice date Clina grants a 2% discount. If the cus-tomer exceeds the agreed payment period, he/she/it comes into default without the need for a reminder.

3.3 If Clina accepts bills of exchange or cheques on the basis of an explicit agreement, any costs thereby incurred must be borne by the customer.

4. Dispatch, Passing of Risk

4.1 If, at the customer's wish, Clina is to send the goods, Clina is then entitled, at its own reasonable discretion, to send the goods by the most favourably priced transport route on account of the customer and at the customer's risk, unless the parties have some other agreement.

4.2 If carriage-paid dispatch has been agreed on, the risk of deterioration and of accidental loss of the goods passes to the customer with the hand-over of the goods to the haulage contractor. All liability on the part of Clina for deterioration and loss due to loading, transportation and unloading that cannot be traced to defective packaging by Clina is excluded.

5. Offsetting, Right to Retention

5.1 All offsetting by the customer against claims of Clina arising from this contract is excluded, unless the counterclaims are uncontested or have been legally established.

5.2 The right of retention by the customer vis-à-vis claims of Clina arising from this contract is excluded, unless this is uncontested or has been legally established.

6. Retention of Ownership

6.1 Clina retains ownership of the delivered goods until full payment of the goods and all commitments arising from the business relationship has been made.
The customer is obliged to handle the goods subject to retention of ownership (conditionally-sold goods) carefully and to store them properly. With respect to the conditionally-sold goods, the customer is not permitted to grant securing rights to the benefit of third parties.

6.2 In the course of orderly business activities the customer is entitled to resell or to process the delivered goods under retention of ownership. To the extent that, as a result of this, the property of Clina perishes or is encumbered by rights of third parties, the customer already assigns his/her/its claims against his/her/its debtors arising from the sale or processing of the conditionally-sold goods, to the value of the purchase price, to Clina. This also includes any existing right to the granting of a debt-securing mortgage. Clina accepts the assignment. The assignment is only to take place on account of performance.

If the customer defaults on his/her/its payment commitments, Clina is entitled and authorized, in the customer's name, to notify the customer's debtor of the assignment and to collect the claim amount itself.

The customer is obliged, at Clina's request, to provide all information and documents necessary for enforcement of the assigned claims.

The preceding paragraphs apply accordingly, to the extent that Clina processes, combines or mixes the goods for the customer as a contractor, though the custom-er is not the owner of the property in question. If the customer combines condi-tionally-sold goods, as a significant component, with property in his/her/its owner-ship, the customer already assigns to Clina the claims arising from the sale of the property or of rights to the property arising, to the value of the purchase price of the conditionally-sold goods. Clina accepts the assignment. The assignment is only to take place on account of performance.

6.3 The customer is obliged to inform Clina immediately, if any attempt is made by a third party to confiscate conditionally-sold goods - as in the case of seizure - or if the conditionally-sold goods are damaged or destroyed. Clina must also be notified of any change of ownership. The customer must inform a third party attempting to confiscate the conditionally-sold goods about Clina's retention of ownership. The same applies in the event of enforcement against a claim amount assigned to Clina in keeping with point 6.2.

The customer must also provide Clina with all information and documents required for legal action.

7. Duty to Notify, Warranty, Liability

7.1 For customers who are businessmen and conclude the contract within the framework of their business activities, section § 377 of HGB [German Commercial Code] applies. The customer must inspect the goods on their arrival and, in the event of a defect, must notify Clina of this immediately in writing.

All other customers must report obvious defects in the goods to Clina in writing, four weeks after receipt of the goods at the latest. If the customer fails to send written notification of the defects within the foreseen period, claims relating to these defects are excluded.

7.2 In cases of defective goods Clina initially warrants for subsequent performance (subsequent improvement or replacement, at the choice of Clina). If the subsequent performance fails, or if it is refused without justification, the customer is then free to opt for price reduction or, provided the subject matter of the claims based on liability for defects does not relate to construction performance, to choose withdrawal from the contract.

For the rest, the statutory regulations apply. Explicitly agreed, deviating periods of limitation for the warranty and guarantee commitments (see Warranty Statement for Heating and Cooling Mats in the Clina product catalogue) remain unaffected.

7.3 Claims to compensation are excluded for delivered parts to which the party ordering has made unauthorized changes or has undertaken subsequent improvements, and for improper assembly / pressure tests or improper further processing of delivered products.

7.4 Clina is essentially only liable for malintent and gross negligence. The same applies to its legal representatives and agents.

If Clina, one of its legal representatives or an agent violates a significant contractual obligation (an obligation the fulfilment of which first makes the proper and orderly implementation of the contract possible, and the violation of which endangers the achievement of the purpose of the contract, and on compliance with which the customer may typically rely on) due to slight negligence, the level of liability is limited to the damage foreseeable, at the time of conclusion of contract, for typical, comparable cases.

Clina is liable without limitations for damage arising from injury to life, limb or health due to negligent or intentional violation of obligations by Clina or one of its legal representatives or agents. Clina is furthermore liable without limitations for claims in keeping with the "Produkthaftungsgesetz" [Product Liability Act].

8. Final Provisions

8.1 The law of the Federal Republic of Germany is applicable, to the exclusion of the UN purchase law (CISG).

8.2 If the customer is a businessman, a public corporation or a public-law fund, or if the customer has no general place of jurisdiction in Germany, the court of jurisdiction for the district in which Clina has its registered address will be solely liable for all disputes arising from this contract.

8.3 If individual regulations of the contract, including the above standard terms of contract, prove to be wholly or partly ineffective or impracticable, this will not detract from the effectiveness of the remaining regulations.

Berlin, 10th July 2015
Clina Heiz- und Kühlelemente GmbH, 13435 Berlin, Germany