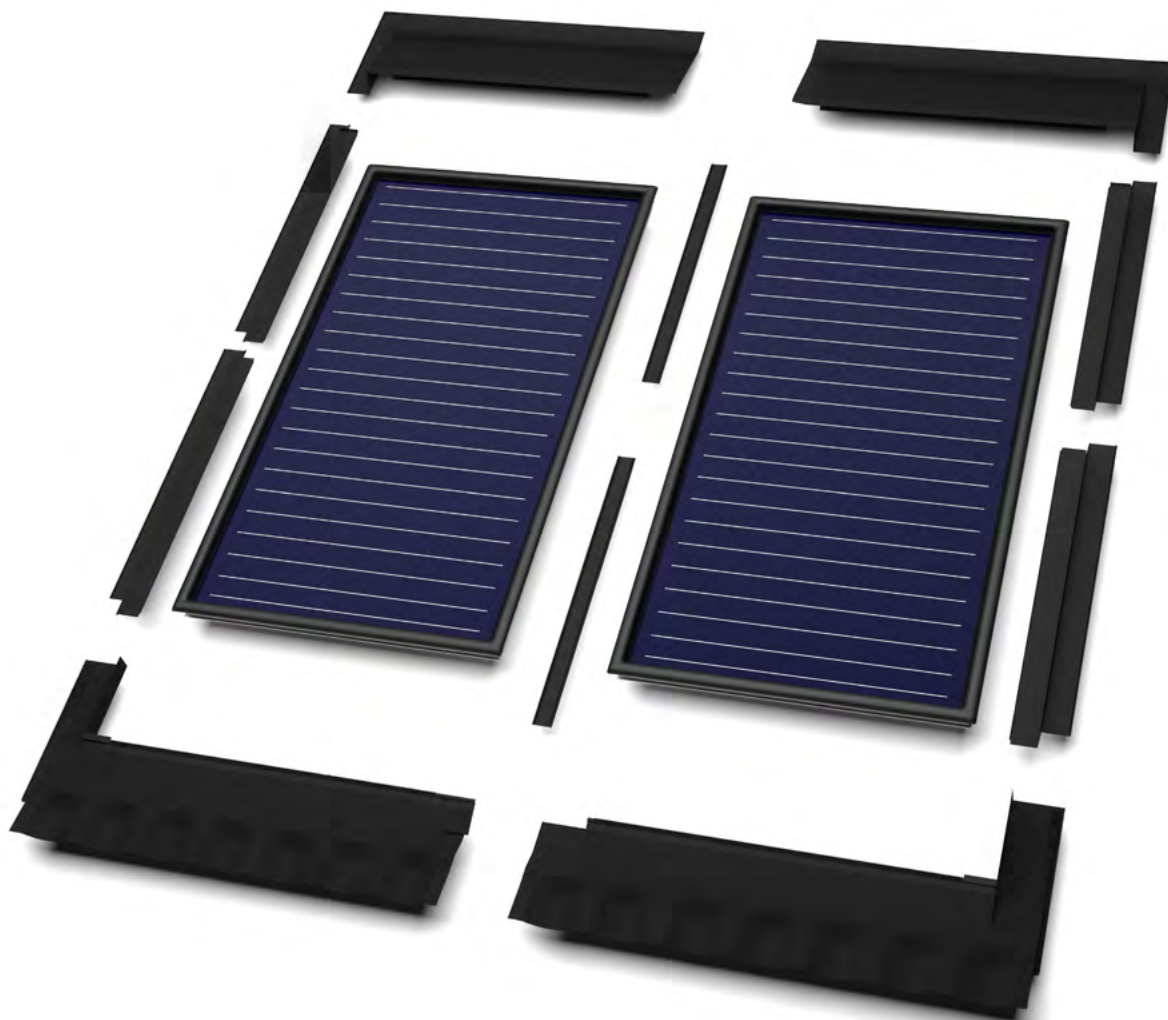


ASSEMBLY INSTRUCTIONS

FKF 200 / 240 / 270 ROOF INTEGRATED



SOLARE KOMPETENZ
AUS SACHSEN

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Please read these instructions carefully before beginning the assembly.

Observe the warnings indicated by this sign:



They warn of dangers and erroneous actions. A disregard of the advices and regulations mentioned in the assembly instruction may result in the invalidation of the warranty claim.

The collectors FKA 200, FKA 240 and FKA 270 are monitored according to the CEN-Keymark programme rules Solarthermal Products and are certified with the registration numbers 011-7S1913/1914/1915 F.

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The collectors of the FKA series are marked with the environmental label RAL-UZ-73 for solar collectors („Blauer Engel“). The STI GmbH is obliged to take back the products which are marked with the environmental label RAL-UZ-73 for solar collectors and to consign them for recycling.

Safety regulations, instructions and guidelines

The standards and guidelines applied at the installation location of the collectors have to be considered in the latest release.

Standards and guidelines

- VBG 4 Unfallverhütungsvorschriften Elektrische Anlagen und Betriebsmittel
- VBG 37 Unfallverhütungsvorschrift Bauarbeiten
- VBG 74 Leitern und Tritte
- ZVDH, Regelwerk
- LBO's Landesbauordnungen der Bundesländer
- DIN 18299 Allgemeine Regelung für Bauarbeiten jeder Art
- DIN 18334 Zimmer- und Holzbauarbeiten
- DIN EN 12828:2013-04 Heizungsanlagen in Gebäuden
- DIN 18338 Dachdeckungs- und Dachabdichtungsarbeiten
- DIN 18339 Klempnerarbeiten
- DIN 18351 Fassadenarbeiten
- DIN 18360 Metallbauarbeiten, Schlosserarbeiten
- DIN 18381 Gas-, Wasser- und Abwasserinstallationsanlagen
- DIN 18451 Gerüstarbeiten
- DIN DIN 1055 – Einwirkungen auf Tragwerke - Teil 2: Bodenkenngößen
- DIN EN 1991 Einwirkungen auf Tragwerke Teil 1-7
- DIN 4708 Teil 3 Zentrale Brauchwassererwärmungsanlagen
- DIN 4102 Brandverhalten von Baustoffen und Bauteilen
- DIN 4109 Schallschutz im Hochbau
- DIN EN 516 Einrichtungen zum Betreten des Daches
- EN 517 Sicherheitsdachhaken
- DIN 4753 Teil 1 Wassererwärmer und Wassererwärmungsanlagen für Trink- und Betriebswasser; Anforderungen, Kennzeichnung, Ausrüstung und Prüfung

Teil 2: Sonnenheizungsanlagen mit organischen Wärmeträgern; Anforderungen an die sicherheitstechnische Ausrüstung

- DIN VDE 0100-510 Errichten von Starkstromanlagen mit Nennspannungen bis 1000 V; Allgemeine Bestimmungen
- DIN VDE 0100-737 Errichten von Niederspannungsanlagen - Feuchte und nasse Bereiche und Räume und Anlagen im Freien
- DIN EN 62305-1; VDE 0185-305 Blitzschutz
- DIN VDE 0105-100 Betrieb von elektrischen Anlagen
- DIN EN 12976: Thermische Solaranlagen und ihre Bauteile (vorgefertigte Anlagen)
- DIN EN 12977: Thermische Solaranlagen und ihre Bauteile (kundenspezifisch gefertigte Anlagen)
- DIN 1988: Technische Regeln für Trinkwasser-Installation

Notes prior to the installation start



The installation and initial operation must be carried out by an expert who is responsible for the correct installation and operation.

Before installing and putting the collectors into service, please inform about the local engineer standards and regulations.

Components of the collectors can reach temperatures of more than 200 °C, there is a danger of burning and scalding!

Furthermore it has to be checked whether there are any load sources in the area of the collector field which may produce chemically aggressive mediums. In condensate dissolved acids and bases may cause permanent damage to the collector components.



Throughout the installation of a solar collector, you directly intervene into an existing roof cladding. Different roof coverings such as tile, shingles or slate require additional measures as a security against the ingress of moisture due to rain or snow - especially in case of extended and occupied top floors or in case of insufficient roof pitches (concerning the covering).

Information on foliation



If the collectors are mounted with foil, this foil must be removed from the collectors at the latest 3 months after delivery. After that, residue-free removal can no longer be guaranteed. The date of the delivery note counts.

Safety regulation, instructions and guidelines

The substructure as well as its connections to the building have to be checked on site according to the local regulations.

The collectors have to be mounted in an angle of at least 20° to max. 70°.

The recommended heat transfer medium is a mixture of glycol and water, e. g. Tyfocor L or similar. The collectors must never be operated or tested with water under pressure.

To protect the system from overheating during standstill and accelerated glycole-ageing, a self-draining system (e. g. STI Drain Master or SolBox) is recommended.

It is necessary to pay attention that the back flow temperature is never lower than the ambient temperature. If necessary, take appropriate action (e. g. increase back flow temperature to at least 30 °C).

To avoid a possible forming of condensate in the collector, the installation has to be taken into operation hydraulically within two weeks after termination of the assembly. At low temperatures, the forming of condensate may cause frost damages in the collector.

Lightning protection

Please note country-specific legislation!
Throughout the installation of metal fastening systems, a check has to be done by an authorized qualified electrician.

The metallic pipes of the solar circle are connected with the earth circuit connector via a copper pipe of at least 16 mm².

Please ensure sufficient ventilation for each assembly method. Do not close the ventilation openings. Especially in case of a roof-integrated assembly, the ventilation of the collector is definitely necessary. Appropriate ventilation hoods are available from the supplier. Please pay attention to the regulations of the ZVDH (Germany), SVDW (Switzerland) as well as different local regulations concerning the ventilation. If necessary, consult an expert.

Responsibilities

The constructor of the installation is responsible for the integration of the installation according to the regulations and for the compliance with safety regulations.

The operator of the installation is responsible for its operation according to the regulations and for the consultation of experts in case of problems.

This instruction is not subject to a service of modification. It does not absolve the manufacturer and operator of the installation from his responsibilities to install and operate all parts of the installation according to utmost professional knowledge. The manufacturer of the installation is responsible for observing and keeping all appropriate regulations and instructions.

Statics

Before beginning the assembly it is vital to test the roof or substructure on site for sufficient load-carrying capacity.

Please pay increased attention to the possible durability of the screw fittings to fasten the collectors as well as to the quality of the substructure.

According to DIN EN 1991 or rather to the local engineer standards, it is necessary to check the whole system construction on site, especially in snowy regions (note: 1m³ powder snow ~ 60 kg / 1 m³ wet snow ~ 200 kg) as well as in regions with high wind speed. Before starting the assembly, all aspects that may lead to incorrect load of the whole construction have to be considered!

Install the collectors in such a way that a backlog of snow (e. g. due to snow guards or other obstacles) is not possible.

In case of correct assembly, snow loads (pressure loads) up to 2 kN/m² and wind loads (suction loads) up to 1,1 kN/m² acting on the collector are permitted.

Transport and stocking

Never store the delivered collectors unprotected at the building site.

Always stock the collectors upright and leaning against a solid surface.

If the collectors are stored outside they must be stood upright with the backside leaned against the wall (glass forwards). The collectors must be covered so that neither dust nor water can enter the collectors.

If it is not possible to stand the collectors upright (e.g. flat roof), the collectors must be stacked with 2 square timbers between each collector.

Never lay down the collectors onto a rough surface with overhanging pieces like stones, timbers etc.

The rigidity of the collectors is limited. During transport to the building site always ensure a torsion-free transport. In case of an elevated intermediate storage make sure that the collectors are protected against sliding down.



Tools

The following tools are needed for the assembly of the collectors:



Cordless screwdriver



Angle grinder



Pencil



Drill



Saw



Knife



Chalk box



Folding yardstick



Hammer



Securing devices, protective equipment



Roof ladder

Product description

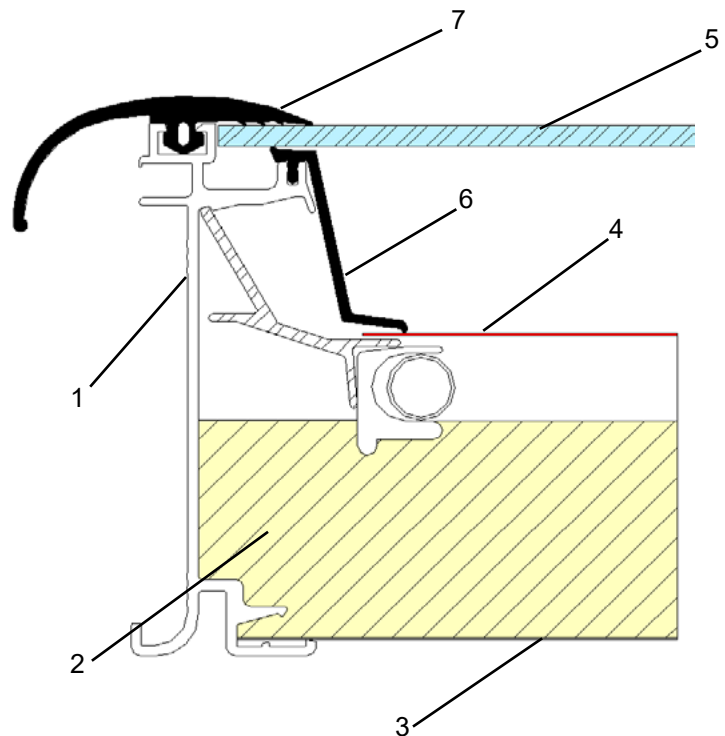


Solar collector FKF

The solar thermal collector FKF uses the radiant energy of the sun to heat a heat transfer medium. This glycol-water mixture gives off the heat to a storage via a heat exchanger. The obtained energy can be used for water heating and heating support.

Sectional model

- 1 Aluminum frame
- 2 Insulation
- 3 Insulation
- 4 Stucco back panel
- 5 Highly selective mono-material copper absorber
- 6 Glass
- 7 EPDM sealing



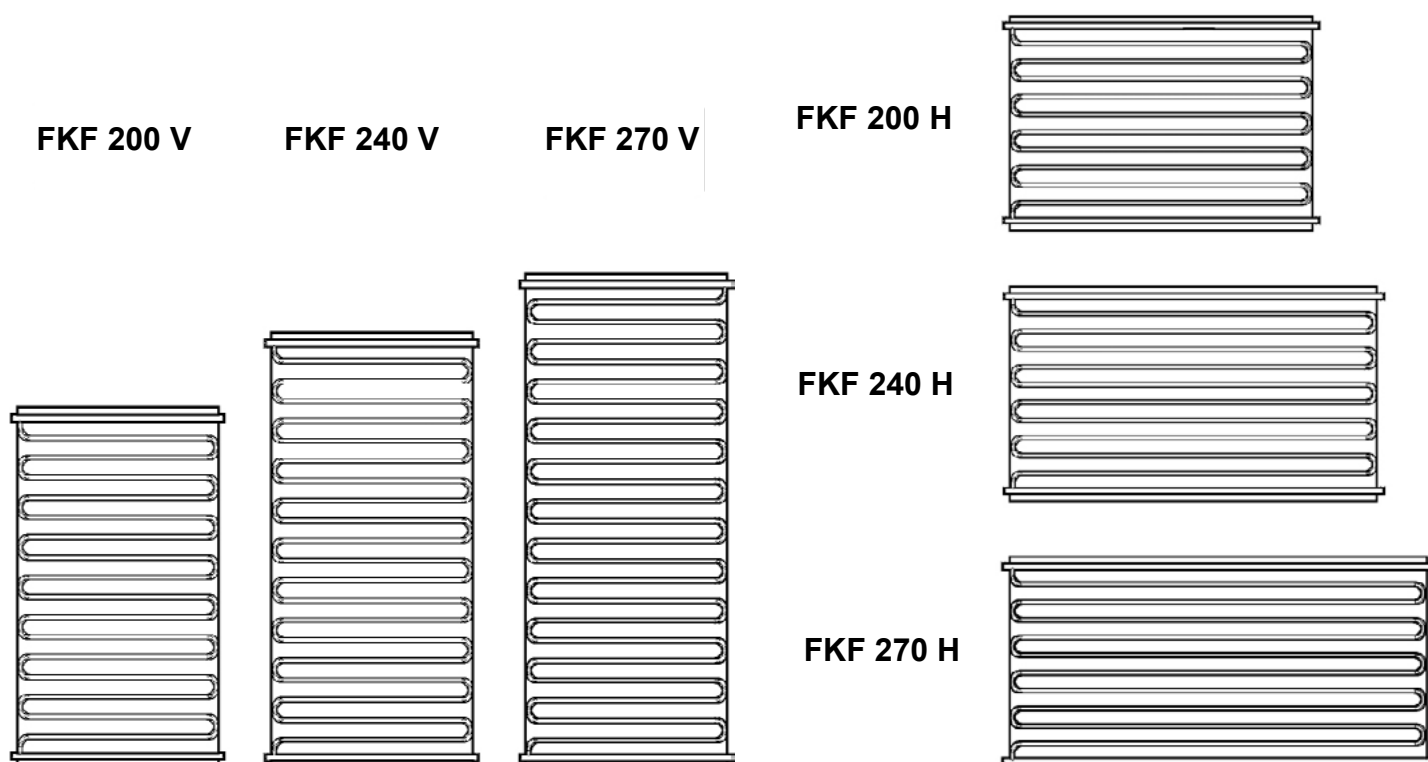
Product description

Specifications

The FKF collector has an absorber with meander shaped tubes as well as integrated manifolds. The hydraulic system enables to connect 15 collectors in one series and up to six collectors on one side. In one collector field up to 45 collectors can be connected in three rows.

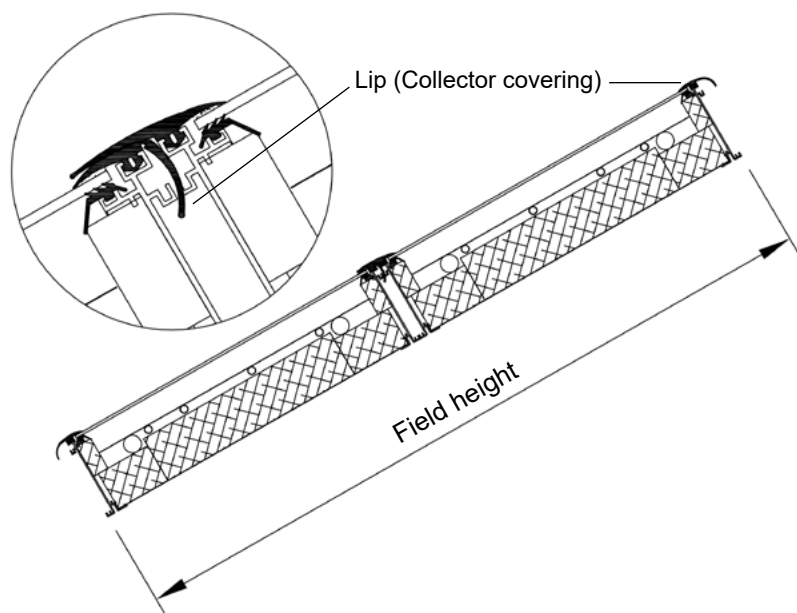
Model FKF	200 V	240 V	270 V	200 H	240 H	270 H
Gross surface	2,10 m ²	2,52 m ²	2,85 m ²	2,10 m ²	2,52 m ²	2,85 m ²
Apertur area	1,83 m ²	2,22 m ²	2,52 m ²	1,83 m ²	2,22 m ²	2,52 m ²
Length	1.746 mm	2.100 mm	2.373 mm	1.200 mm	1.200 mm	1.200 mm
Width	1.200 mm	1.200 mm	1.200 mm	1.746 mm	2.100 mm	2.373 mm
Height	85 mm	85 mm	85 mm	85 mm	85 mm	85 mm
Test pressure	10 bar	10 bar	10 bar	10 bar	10 bar	10 bar
Operating pressure	6 bar	6 bar	6 bar	6 bar	6 bar	6 bar
Fluid volume Co-Co / Al-Co	2,1 l	2,2 l	2,4 l	2,7 l	2,7 l	3,1 l
Fluid volume Al-Al	1,8 l	1,9 l	2,1 l	2,4 l	2,4 l	2,7 l
Flow per m ²	15 - 40 l/h	15 - 40 l/h	15 - 40 l/h	15 - 40 l/h	15 - 40 l/h	15 - 40 l/h
Weight Co-Co	37 kg	39 kg	42 kg	37 kg	39 kg	42 kg
Weight Al-Co	35 kg	37 kg	40 kg	35 kg	37 kg	40 kg
Weight Al-Al	34 kg	35 kg	38 kg	34 kg	35 kg	38 kg
Loss of pressure (T=20°C / 30l/h)	6.141 Pa	8.522 Pa	11.217 Pa	4.082 Pa	6.297 Pa	7.988 Pa

Hydraulic system of the absorber



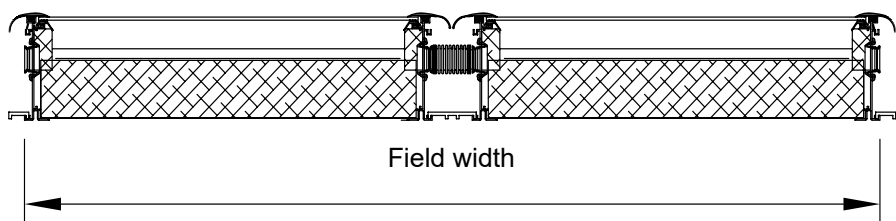
Collector field dimensions

Vertical section across a collector field



In case of multi-row installations, the collectors will always be mounted on joint on top of each other. The lip (collector covering) of the upper collector has to be put onto the lower collector. The lip (collector covering) of the lower collector has to be clamped into the joint area to ensure an optimum water flow.

Horizontal section across a collector field



Collectors which are mounted side by side in one row are always connected by means of stainless steel expansion joints on the manifolds (see photo).



1300002 collector connection set hydraulic



Collector field dimensions

Collector type

200 V	Number of collectors	1	2	3	4	5	6	7	8	
	Field width in mm	1.167	2.387	3.607	4.827	6.047	7.267	8.487	9.707	+ 1.220
	Number of rows	1	2	3	4	5	6	7	8	
	Field height in mm	1.713	3.426	5.139	6.852	8.565	10.278	11.991	13.704	+ 1.713

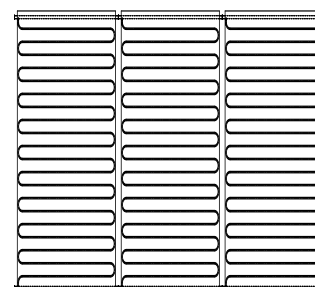
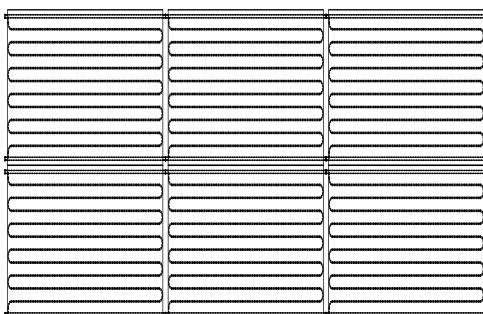
200 H	Number of collectors	1	2	3	4	5	6	7	8	each additional collector
	Field width in mm	1.713	3.479	5.245	7.011	8.777	10.543	12.309	14.075	+ 1.766
	Number of rows	1	2	3	4	5	6	7	8	
	Field height in mm	1.167	2.334	3.501	4.668	5.835	7.002	8.169	9.336	+ 1.167

240 V	Number of collectors	1	2	3	4	5	6	7	8	each additional collector
	Field width in mm	1.167	2.387	3.607	4.827	6.047	7.267	8.487	9.707	+ 1.220
	Number of rows	1	2	3	4	5	6	7	8	
	Field height in mm	2.067	4.134	6.201	8.268	10.335	12.402	14.469	16.536	+ 2.067

240 H	Number of collectors	1	2	3	4	5	6	7	8	each additional collector
	Field width in mm	2.067	4.187	6.307	8.427	10.547	12.667	14.787	16.907	+ 2.120
	Number of rows	1	2	3	4	5	6	7	8	
	Field height in mm	1.167	2.334	3.501	4.668	5.835	7.002	8.169	9.336	+ 1.167

270 V	Number of collectors	1	2	3	4	5	6	7	8	each additional collector
	Field width in mm	1.167	2.387	3.607	4.827	6.047	7.267	8.487	9.707	+ 1.220
	Number of rows	1	2	3	4	5	6	7	8	
	Field height in mm	2.340	4.680	7.020	9.360	11.700	14.040	16.380	18.720	+ 2.340

270 H	Number of collectors	1	2	3	4	5	6	7	8	each additional collector
	Field width in mm	2.340	4.733	7.126	9.519	11.912	14.305	16.698	19.091	+ 2.393
	Number of rows	1	2	3	4	5	6	7	8	
	Field height in mm	1.167	2.334	3.501	4.668	5.835	7.002	8.169	9.336	+ 1.167



Example

Six collectors FKF 240 H in two rows

Field width: **6.307 mm**
Field height: **2.334 mm**

Example

Three collectors FKF 240 V in one row

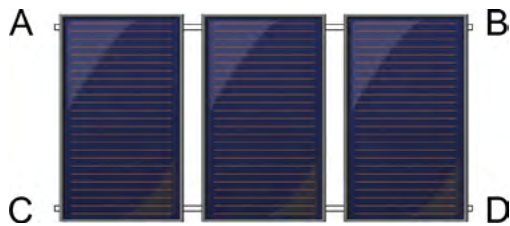
Field width: **3.607 mm**
Field height: **2.067 mm**

Hydraulic connections

Temperature sensor

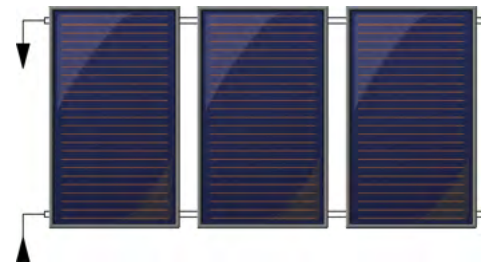
Each collector has a sleeve for inserting a temperature sensor. The sleeve is directly connected with the absorber. If the collectors are installed correctly, the sleeve is always located on the top of the collector on the left. The temperature sensor can be inserted in any collector. Please pay attention to the maximum insertion depth of 4 cm and secure the sensor against slipping out. Due to the measuring point on the absorber, the temperature measured by the sensor may differ from the fluid temperature.

Installations with one up to six collectors in one row

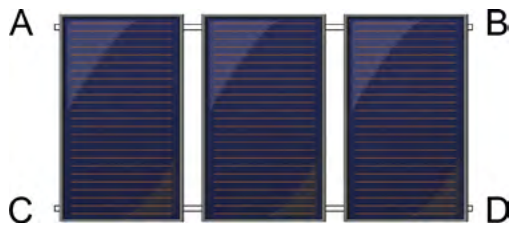


Connection F red A or B
Connection BF blue C or D

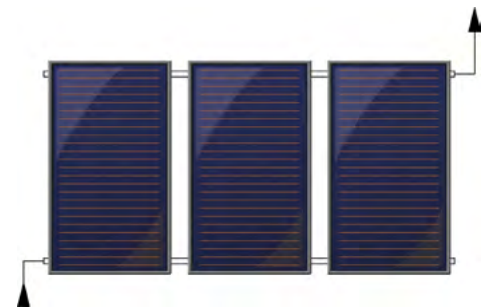
Close unused connections with caps.



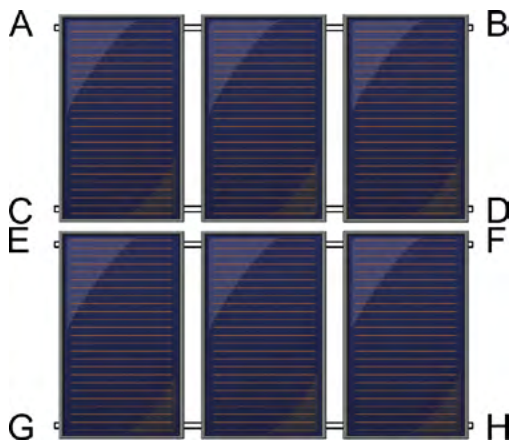
Installations with seven up to 15 collectors in one row



Connection bottom left / top right
 $BF = C / F = B$
Connection top left / bottom right
 $BF = D / F = A$
Close unused connections with caps.

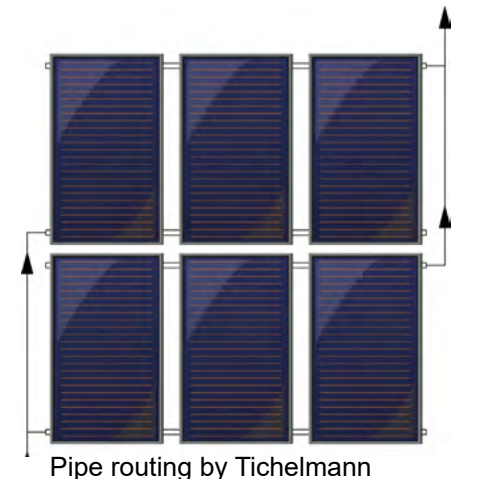


Multi-row installations



Connection F A + E / BF H + D
Connection F B + F / BF G + C

Close unused connections with caps.



Pipe routing by Tichelmann

In case of multi-row installations as well as installations which include the STI Drain Back System, the connection pipe must always be connected with the diagonal line to the external manifold (Tichelmann), e. g. bottom left and top right.

F = Flow (from the collector to the storage) red grommet

BF = Backflow (from the collector to the storage) blue grommet

In case of installing an air eliminator, install it at the opposite end of the top flow connection!

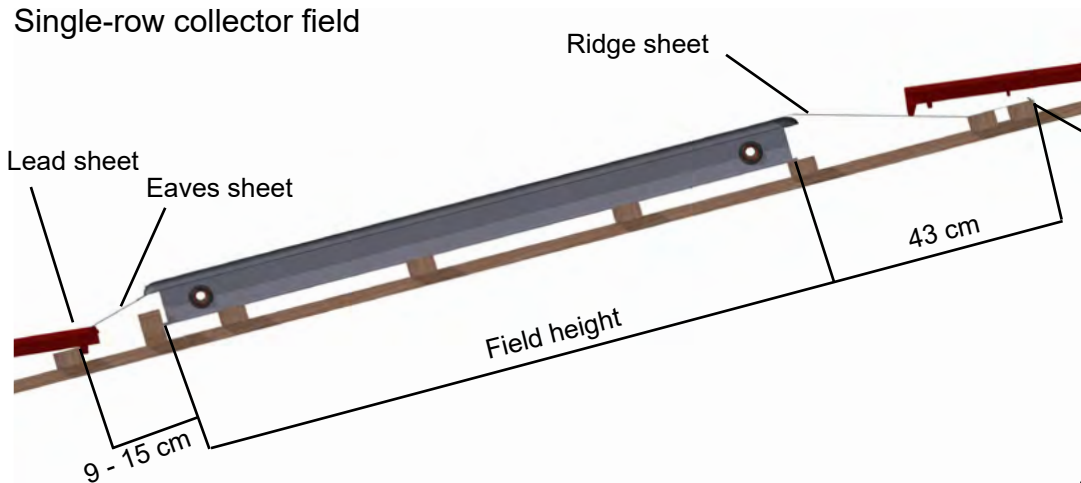


Collector field sectional drawing

Vertical cross section of the collector field

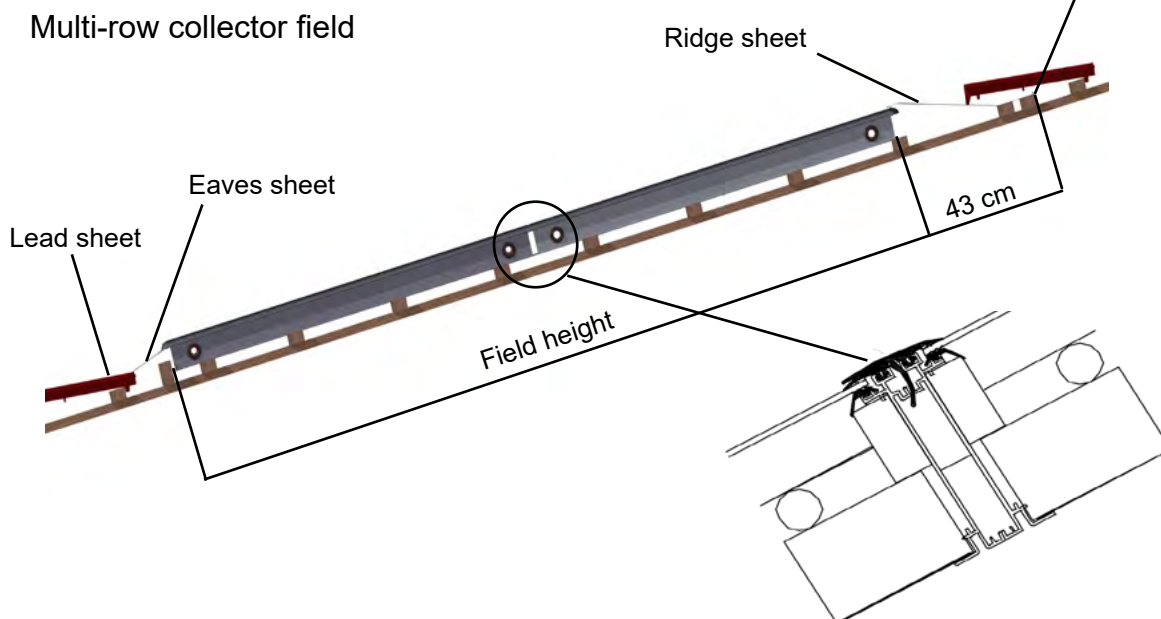


Single-row collector field

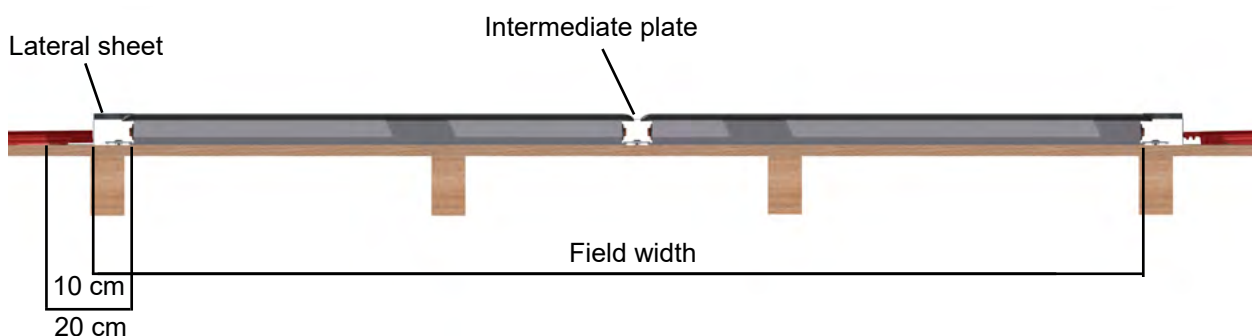


If there is no lath available in this area which serves as a support, you have to assemble it.

Multi-row collector field



Horizontal section across a collector field

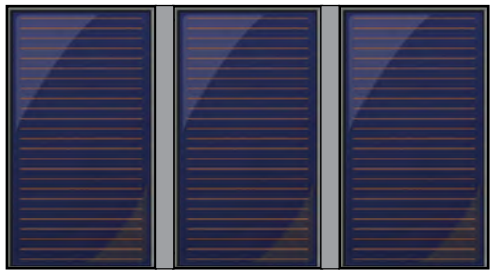


An adjustment of the sheet edging or of the ridge sheet on site is possible upon request.

Assembly preparation - sequence

Single-row collector field

When assembling single-row collector fields, the collectors will be mounted starting with the respectively outer collector. The exact assembly of the collectors will be described starting with page 29.



Single-row collector field

Assembly sequence



or



Multi-row collector field

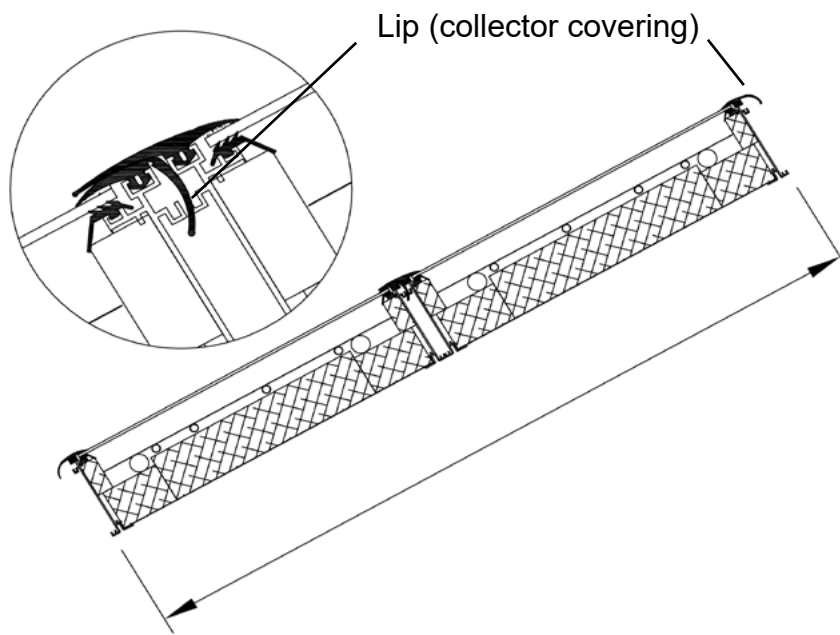
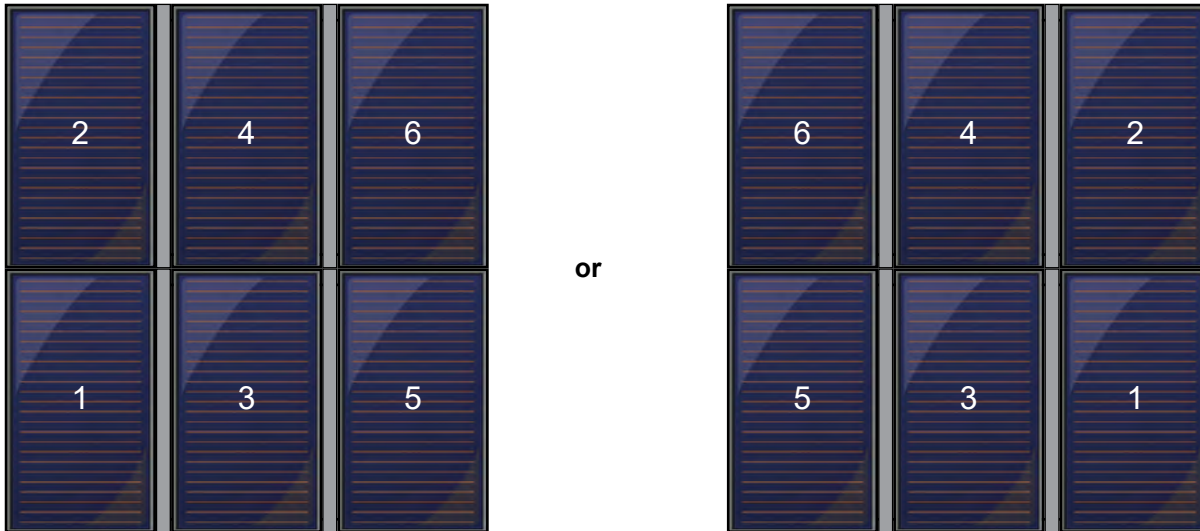
When assembling multi-row collector fields, the collectors which are located one above the other will be mounted first of all. After placing the first collector, the second collector will be adjusted above the first one. The collectors which are lying one above the other have to be aligned accurately. The exact assembly of the collectors will be described starting with page 32.



Multi-row collector field

Assembly preparation - sequence

Assembly sequence



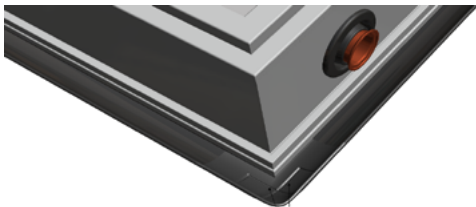
In case of multi-row installations, the collectors have to be mounted adjoining. The lip (collector covering) of the top collector is set over the lower collector. The lip (collector covering) of the lower collector is clamped into the joining area which guarantees an optimum waterflow.

Assembly of the intermediate plates/ multi-row collector fields

Multi-row collector fields

To attain a homogenous appearance of the collector installation, the assembly of sheets between the collectors is possible. The intermediate plates are exclusively assembled due to optical aspects and do not have a functional impact on the installation. This is the reason why the intermediate plates can be ordered optionally and are not necessarily included in the delivery contents.

When assembling multi-row collector fields, the collectors in the rows above the other rows will always be mounted edge to edge. To subsequently be able to assemble the intermediate sheets without any problems, the lip (collector covering) of the lowest collector has to be cut out at the respective parts.

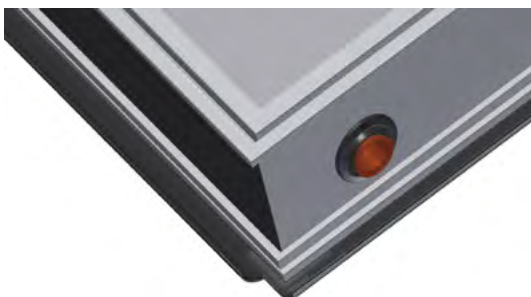


Prefabricated cuts at the bottom of the collector covering



For the assembly of the intermediate plate, the prepared cut of the lip (collector covering) will be cut out at the respectively lowest collector. Thereby, you have to pay attention that only the cuts which lie horizontally will be cut out. Cuts will only be processed where an intermediate plate will be assembled.

For the assembly of the collectors in multiple rows as well as for the assembly of curved intermediate plates, the processing at the outside of the collector field is necessary as well.



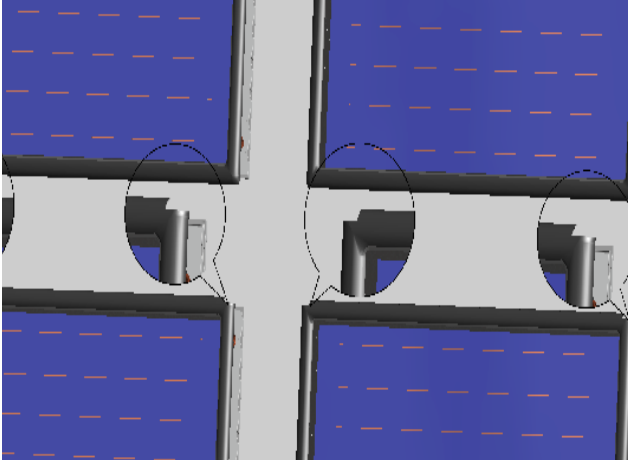
The cuts which have to be made are marked at the bottom:

V: Cut for vertical collectors

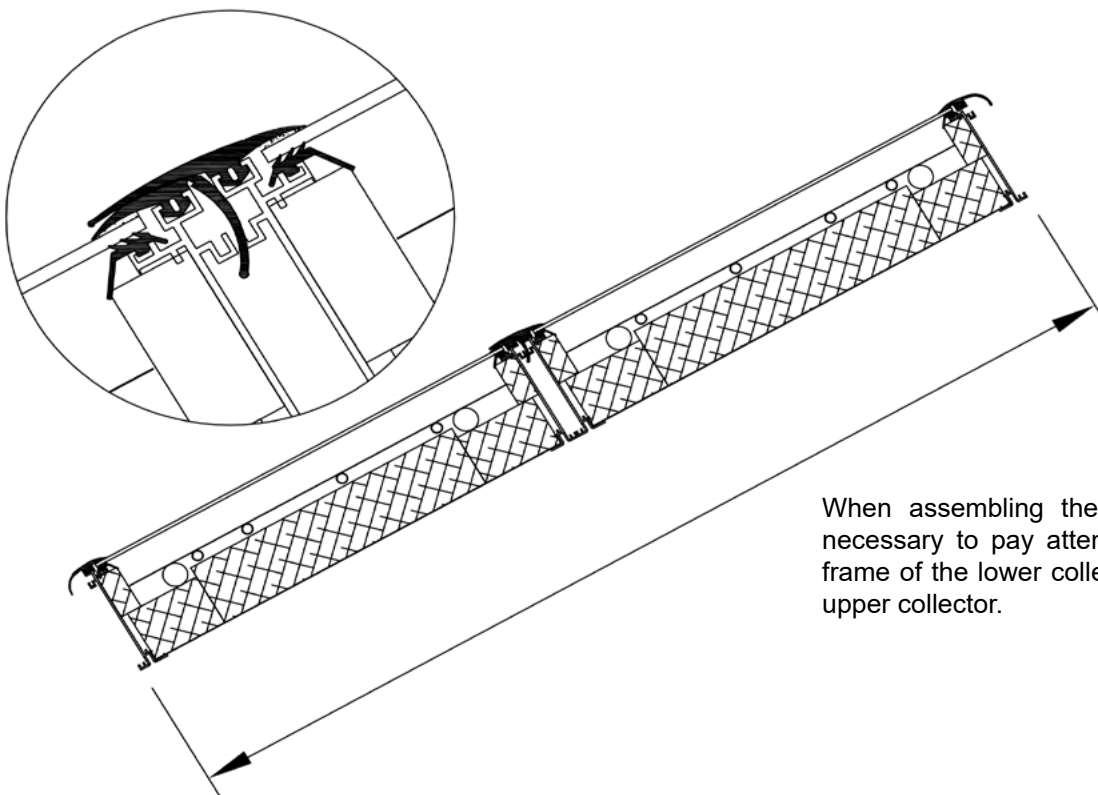
H Cut for horizontal collectors

Cut out the lip (collector covering) with a knife at the respective and prepared cuts.

Assembly of the intermediate plates



By removing the lip (collector covering) at the prepared point the subsequent assembly of the intermediate plates and lateral sheets will be enabled.



When assembling the upper collector it is necessary to pay attention that the collector frame of the lower collector is covered by the upper collector.

The assembly of the collectors will be described in the following. The assembly of the intermediate plates is described on page 37.

Assembly of the solar collectors

First uncover the tiles in the area where the collectors will be mounted.

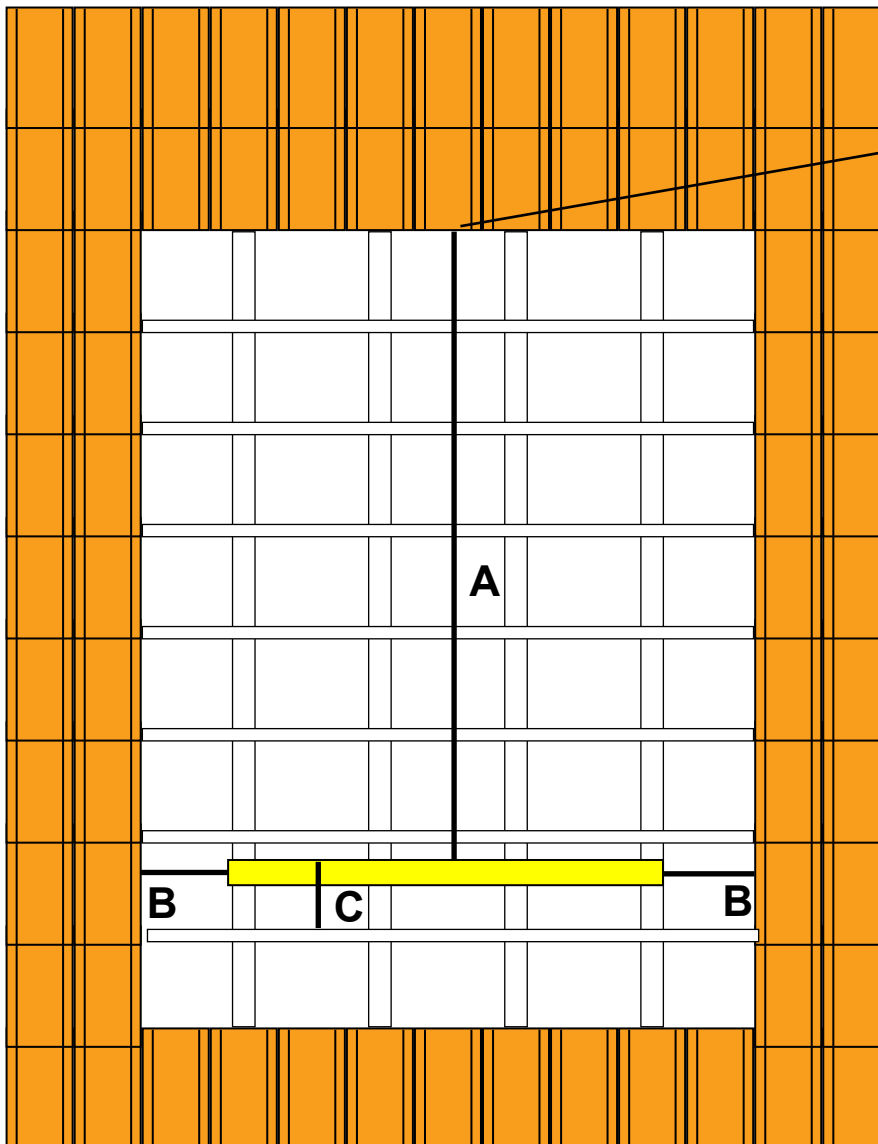
The total width results from: Field width (page 8) + 40 cm

The total height results from: Field height (page 8) + 53 to 62 cm

Place the stop lath(s) to prepare the assembly of the collectors.

Ensure that the stop lath is fixed parallel and straight (line mark) to the counter lath.

Pay attention to stringently stick to the measure A of the assembly of the construction lath!



To avoid a cutting/processing of the upper tile row it is recommended to uncover the upper tile row as well based on measure A.

Also consider that the measure A is metered from top to bottom.

For precise placement of the construction lath, please use the measurements in the table below.

If the fastening point is on +/- 5 cm the impact region within the cross battens you have to introduce an additional batten according to the technical rules of the attachment point is moved.

construction lath KVZ 40 x 60 mm
 1440104 FKF 200/240/270 V L= 1,2 m
 1440112 FKF 200 H L= 1,7 m
 1440103 FKF 240 H L= 2,1 m
 1440105 FKF 270 H L= 2,5 m

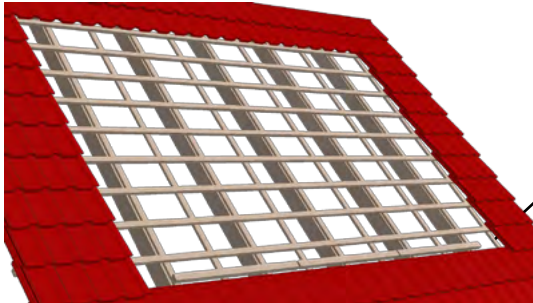
3000155 Chipboard screw
 5x100 mm



Collector type	measure A *	measure B	measure C	for each add. row
FKF 200 V	1,97 m	minimum 20 cm	9 -15 cm	measure A + 1,72 m
FKF 240 V	2,33 m	minimum 20 cm	9 -15 cm	measure A + 2,07 m
FKF 270 V	2,60 m	minimum 20 cm	9 -15 cm	measure A + 2,34 m
FKA 200/240/270H	1,43 m	Minimum 20 cm	9 -15 cm	measure A + 1,17 m

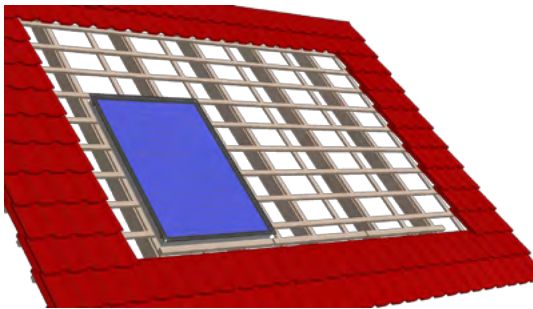
* The declared values for measure A are valid for single row installations.

Assembly of the solar collectors



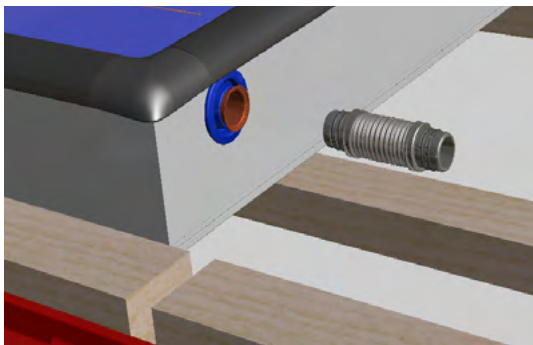
Uncovered roof area with construction lath.

Fixation with chipboard screws (3 pieces per lath).



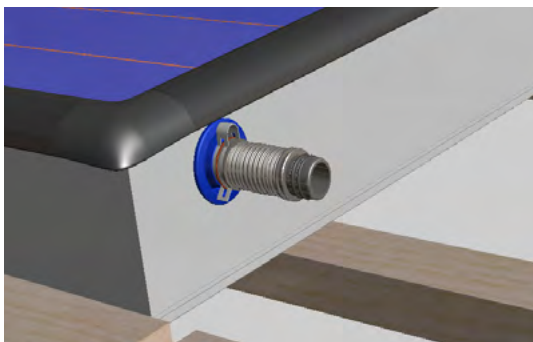
Placement of the first collector.

The exact alignment and fixation happens after laying on and connecting of all collectors.



Before the following collector can be layed down the hydraulical collector connector must be mounted at the concisely overhanging collector connection.

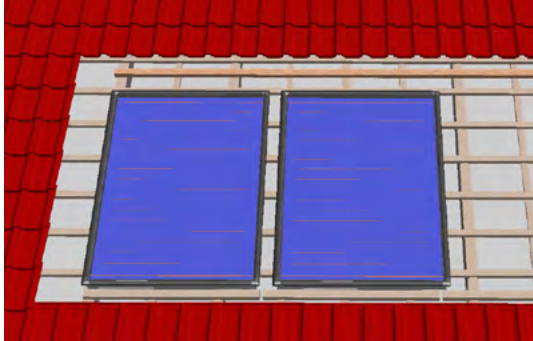
1300002 collector connection set hydraulical



Insert the hydraulic collector connerctor into the manifold. Pay attention that both O-rings are mounted. Push the connector all the way to the stop and secure it with the spring lock.

At the upper as well as at the lower collector connection the hydraulical collector connector will be pre-assembled according to the image alongside.

Assembly of the solar collectors

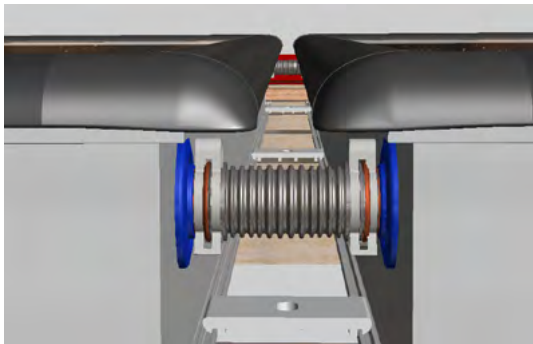


After placing the first collector the following collector is placed at a distance of 10 to 20 cm beside the first collector.

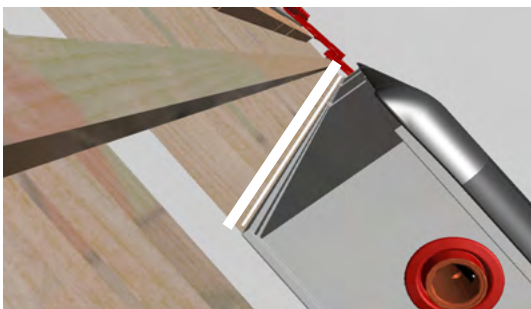
The hydraulic collector connector must be mounted now on the first collector.

Afterwards the following collector must be carefully pushed until the hydraulic collector connectors engage into the collector connection.

The collector connection plates provided ensure the correct distance of the collectors. It is important to ensure that the clamping plates are not mount.



Secure the hydraulik connector also with the fastening clip.



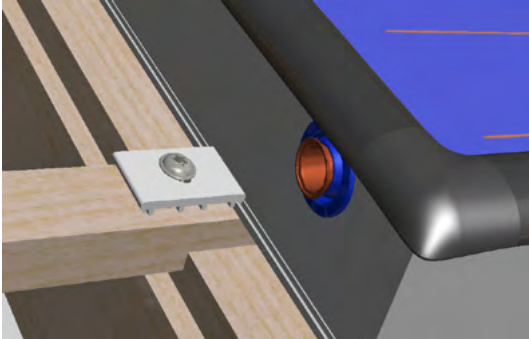
Repeat this for all collectors and connections in a row.

After that the adjustment and fastening of the collectors starts.

Take care that the collectors have the same alignment. (String)



Assembly of the solar collectors

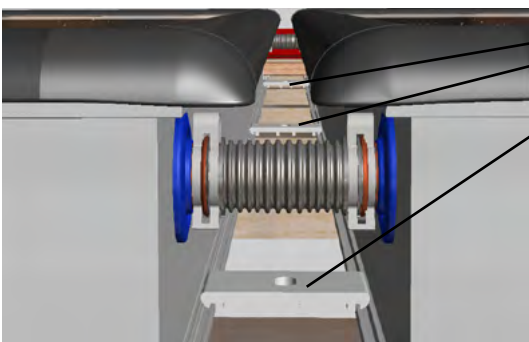


On the outside is the collector mount by three connection plates.
If the collector fixing point is on a picket kick, a additional roof lath must be mounted below. On the mounting must be on the additional roof lath.

1400103 collector connection set roof integrated 2014
1910101 tool set 2014



The collector will be mounted on one side with three collector connection plates



On the inside (between the collectors) are also three connection plates mount. The distance between the two collectors is given by the connection plate.
The connection plate engages left and right into the collector profile.

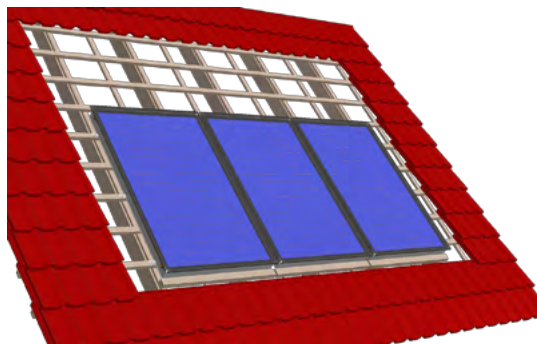
1400103 collector connection set roof integrated 2014
1910101 tool set 2014



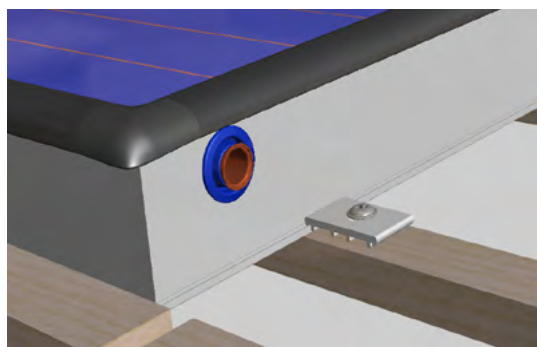
It must be ensured that the collector connection plates don't lie under a hydraulic connector. Because the hydraulic connector covers the screw of the connection plate the final mounting of the collector connection plates is not possible



Assembly of the solar collectors

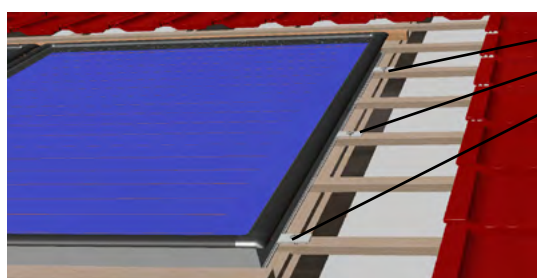


This procedure will be repeated for every single solar collector and all mounting plates.

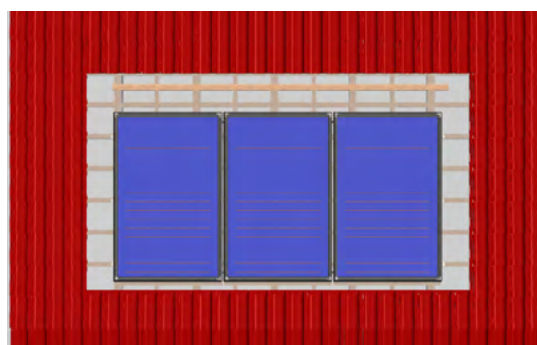


After having placed the last collector it has to be fixed with the outer fastening plates at three points.

1400103 collector fastening set built-in 2014
1910101 tool set 2014

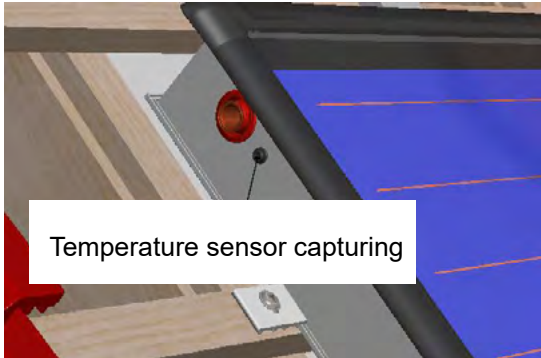


Fastening plates



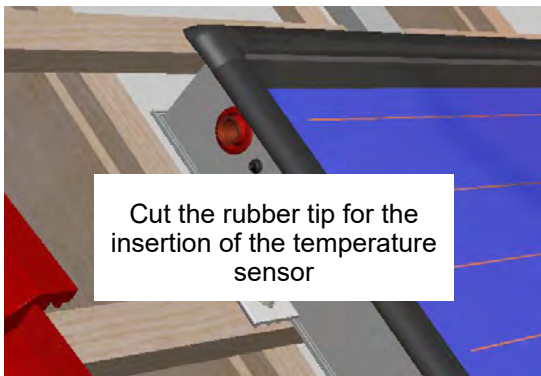
Completely mounted and fixed collector row.

Assembly of the probe



Every collector is equipped with a sheath for the positioning of a temperature sensor.

The position of the temperature sensor is located below the upper left manifold outflow or to the left of the sticker with the label „above“ at the outside of the frame profile. The sheath for the insertion of the sensor is protected by a silicone cover which has to be opened with a knife or a screw driver centred before the insertion.

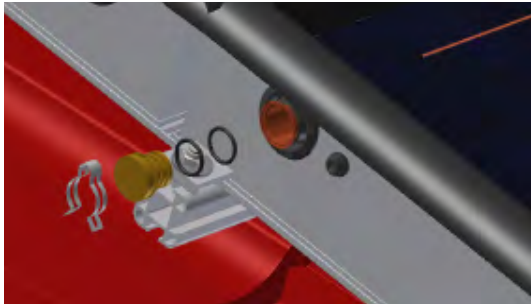


The insertion depth of the sensor is limited to 4 cm. An additional safeguard against a slipping out is recommended.

Due to the measuring point on the absorber, the sensor can be installed at an arbitrarily chosen collector of the collector field.

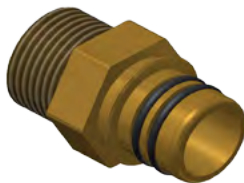
The measurement deviation of the recorded temperature is ± 2 K compared with the medium temperature.

Collector connections



The cap will be mounted everywhere where a collector connection is not used.

1310209 Cap set (2 pieces complete)
1310119 Cap set aluminium (2 pieces complete)



Connection 3/4"

1310205 Collector connection set R3/4"
(2 pieces complete without cap)



Connection for soldering or clamping ring transition

1310204 Collector connection set 22 mm
(2 pieces complete without cap)
1310114 Collector connection set 22 mm aluminium
(2 pieces complete without cap)



Completely mounted air eliminator with extension.

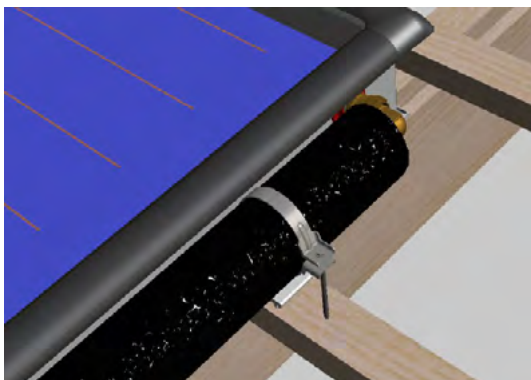
1310208 Air eliminator set with extension pipe
(compl. with caps)



The required connection dimension für the mentioned collector connections has to be calculated by the scheduler of the installation depending on the regional circumstances (lengths of the pipelines, additional resistors etc.)

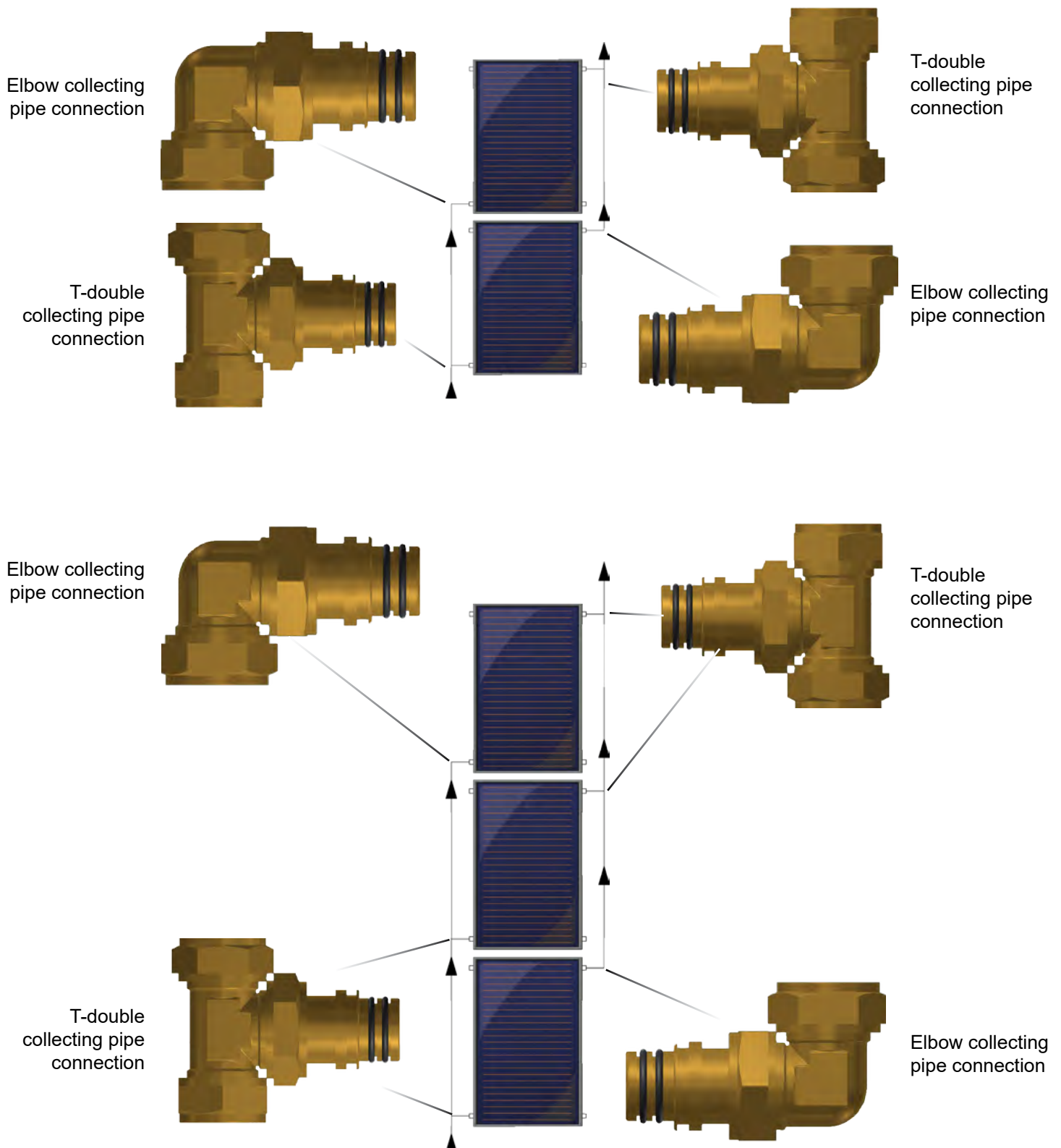
The accessibility has to be given. For multi-row systems the mounting of the air eliminator is made in the top row.

The connection lines or lateral manifolds should be safeguarded with a clamp in the region of the collector connections on the warm and the cold side for a relaxation of the tension. This has to be carried out by the customer.



Hydraulic connection with manifold

Hydraulic connections for multi-row systems



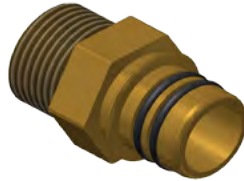
The whole equipment is available from STI.

Overview hydraulic connections SLS / accessories

Hydraulic connections copper



Exhauster connection
For the installation at the collector with extension Smart Lock System



Collector connection 3/4" for thread fittings
Smart Lock System



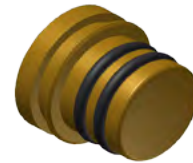
Collector connection 22 mm for soldered fittings or clamping ring joints
Smart Lock System



Collector connection hydraulic (compensator) which connects two collectors and compensates thermal dilations
Smart Lock System



Clamp collector connection and O-ring seal
Clamp for connection of the above mentioned hydraulic devices with the flange at the collector



Cap
Smart Lock System

Accessories



Tool set



Spare set hydraulic



Assembling spare set

Overview hydraulic connections / accessories aluminium

Collector connections aluminium for collectros with aluminium pipe



Collector connection 22 mm
Aluminium
Smart Lock System



Cap
Aluminium
Smart Lock System



Collector connection hydraulic



Hydraulic connection set
clamping ring 90 °
Pressfitting M-Shape



Hydraulic connection T-piece
Pressfitting M-Shape



Safety line

Notes Al/Al absorber

Please pay attention to the user instructions for the usage of collectors with full aluminium absorbers (aluminium sheet, aluminium pipe) mentioned below:

- All hydraulic connection fittings of the collector have to be made from aluminium or stainless steel.
- Hydraulic system components made from brass and copper must be mounted with a minimum distance of 2,5 m to the collector.
- It is absolutely necessary that neither brass slivers nor copper slivers will be brought into the hydraulic system.
- The solar collector has to be a closed system. Additional air inlet from outside has to be avoided mandatorily. This is the reason why open installations or those which are flushed directly with drinking water are not possible.
- The glycol used has to contain respective inhibitors. Additionally, the guidelines of the producer of glycol have to be observed to assure a long-term protection of the installation.
- Recommended and tested heat transfer medium: Tyfocor ® L of the Tyforop GmbH
- At the solar station, pump or control system, it has to be highlighted that the collectors had been built with a full aluminium absorber.

Assembly of the connecting pipe



The connecting pipe can be adjusted individually. To do this, the corrugated pipe from stainless steel has to be cut into the appropriate length. For this purpose, please use a pipe cutter. Check the pipe ends for impurities, deformations and the absence of burrs.

Please be aware that only the connecting pipe DN20 l = 15 m can be adjusted individually. Any other corrugated pipe lines from stainless steel of the STI programme will be delivered in fixed lengths.

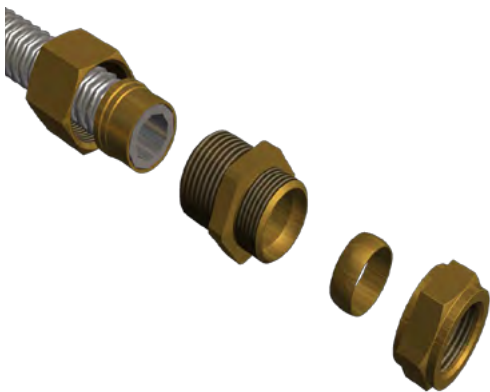


1320304 Connecting pipe DN20 l=15 m,
PES isolation

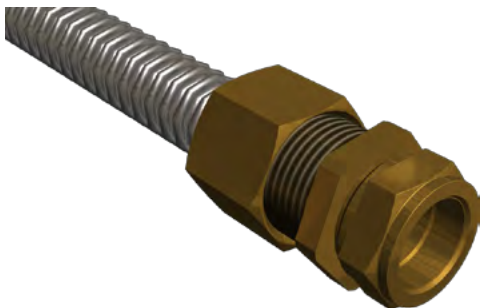


In the next step, the components will be slid onto the pipe ends according to the drawing alongside. Please pay attention that the pipe will be pushed all the way through the clinching ring into the fitting. Fasten the screwcap finger tight. Afterwards, the bolt nut has to be tightened by 3 1/2 to 4 turns with appropriate wrenches.

Generally, the whole connection has to be verified for imperviousness according to the recognized valid rules of engineering after conclusion.



Readily mounted connection pipe with screwing.

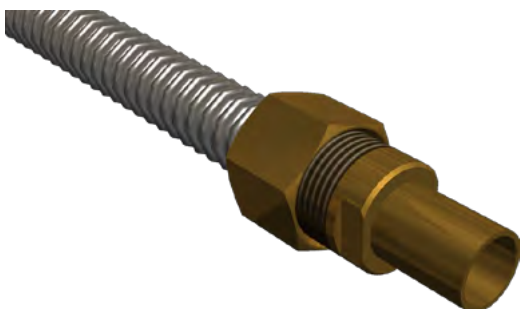


1320320 Connection set for connection pipe
22 mm connector

1320321 Connection set for connection pipe
22 mm screwing



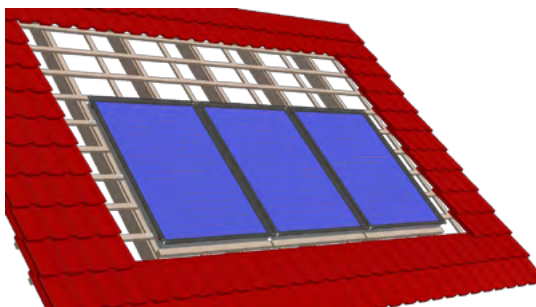
Readily mounted connection pipe with connector.



Assembly eaves sheet

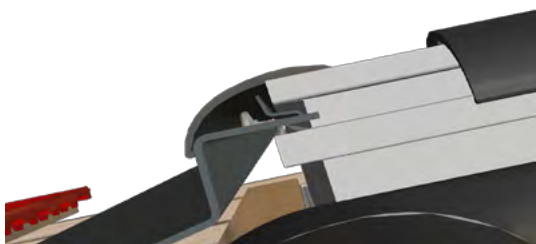
Preparation

Before starting the assembly of the plate set the collector field must completely be installed hydraulically, rinsed, bled and tested for leak tightness. Stop possible defects before starting assembly of the plate set. Subsequent installation or checking is not possible when the sheets are mounted.



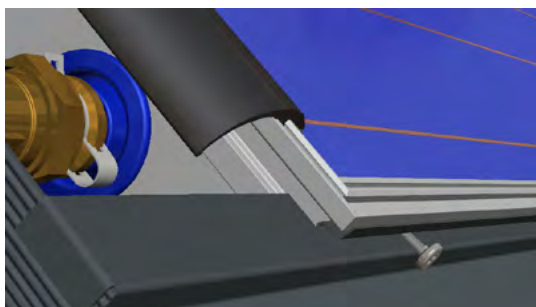
Start the assembly of the plate set starts definitively with the left eaves sheet.

The following eaves sheets must be pushed on the left into the respective previously mounted eaves sheet.

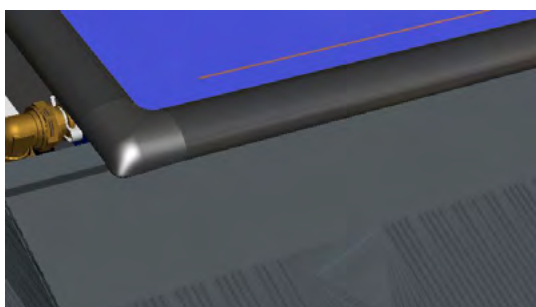


Push the eaves sheet on the left side under the sealing lip and click it into the groove of the collector profile.

After pushing the eaves sheet to the left side till the collector frame there should be 10 cm overhang left for the lateral sheet.

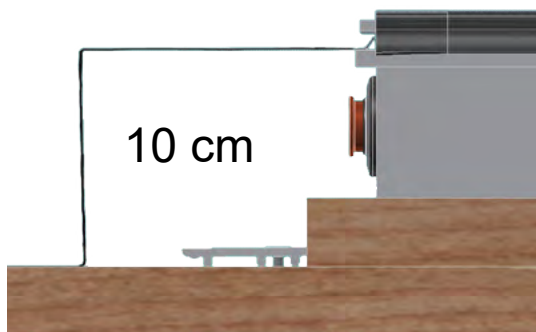


For a more accurate illustration the EPDM is excluded.

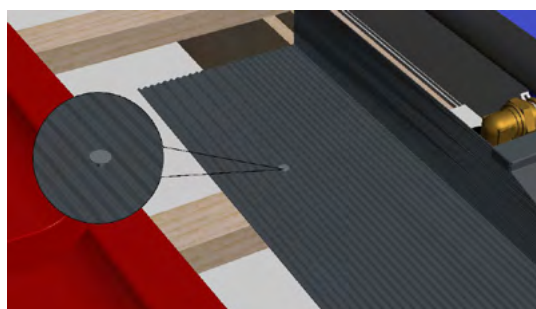


The lateral distance is determined by the shape of the sheets.

Assembly eaves sheet

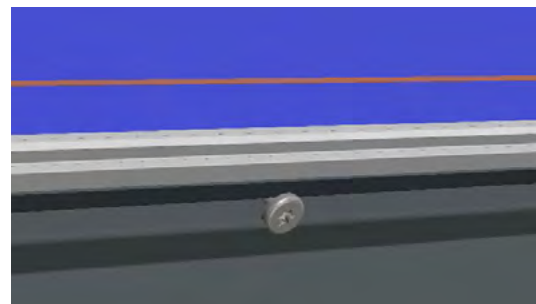


Check, before mounting the lateral sheets, if the eaves sheet has an overhang distance of 10 cm from the collector. If necessary, adjust.



Where the lateral sheet has an overhang fixate the eaves sheet with a nail at the maximum of 8 cm from the top. Where appropriate, a additional rail has to be mounted.

By means of the sheet seam the lateral sheet has to be adjusted to the roofing.

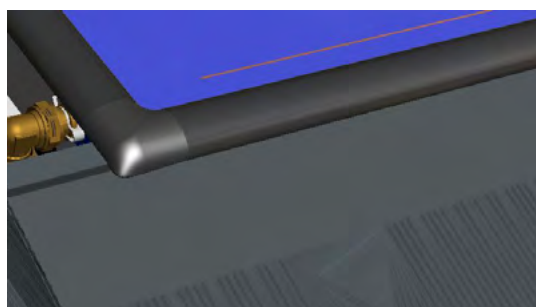


After clicking and aligning the left eaves sheet, fix it with the three supplied glands in the pre-punched holes.

1910001 tool set



Turn the screws 90° clockwise.

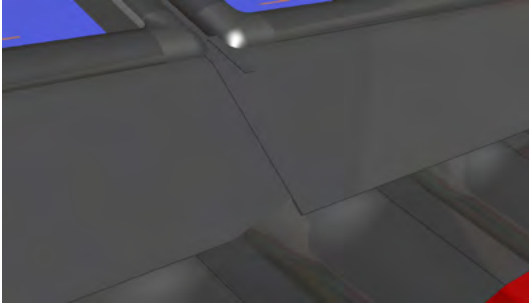


Completely mounted eaves sheet left.

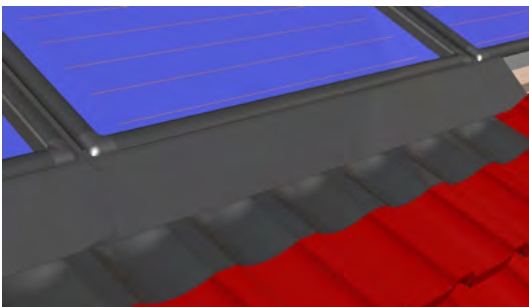
Assembly eaves sheet

Eaves sheet extension or eaves sheet right

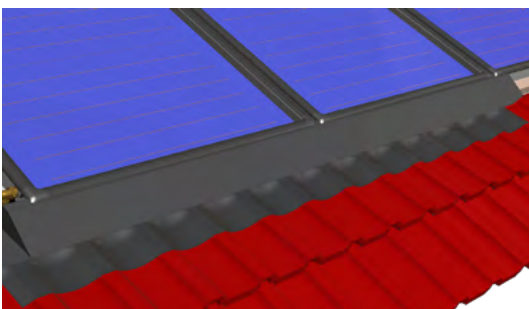
When mounting more than two collectors in one row, install the eaves sheet extension. Depending on the number of collectors as many extensions as needed are installed for all collectors. Finally install the eaves sheet right.



The eaves sheet right is pushed under the sealing lip and clicked into the groove of the collector profile.

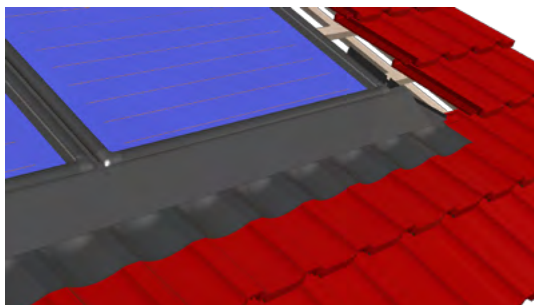


The following eaves sheet has to be clicked into the collector flute on the right side below the sealing lip. Subsequent push the eaves sheet into the flute of the already mounted eaves sheet on the left side.

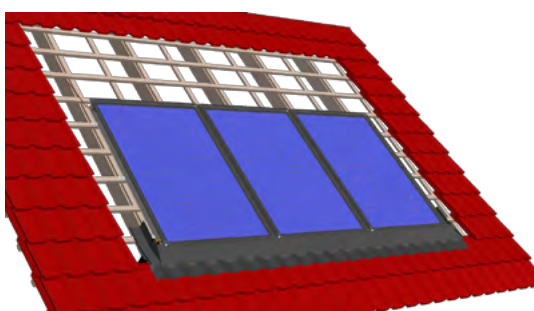


Afterwards fixate the eaves sheet extension with the attached sealing screws in the collector frame. Therefor use the pre-punched holes in the eaves sheet.

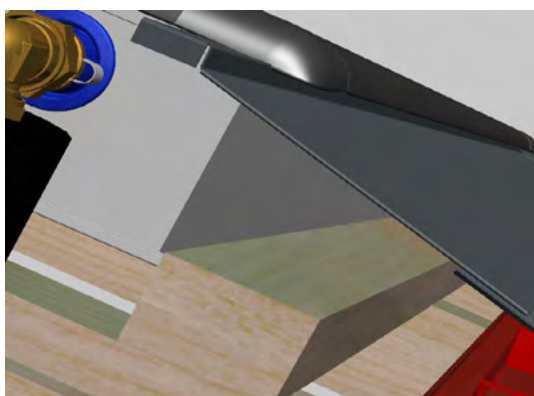
Assembly eaves sheet



Depending on the number of the collectors the next eave plate extensions and accordingly the eave plate must be mounted and fasten on the right side.



Fully assembled eaveplates.



If the installation of collectors on roofs with flat roof, for example, slate, shingle or Prefa, can be installed to support the eave plate can be installed an additional lath under the eave plate.



Flat roof tiles with a maximum of 15mm profiling where the grooved rolled lead cannot be shaped:
In this case it is necessary to fixate the lead rag with a reversible butyl tape on the covering. Alternatively the lead rag can be cut off if the eaves sheet overlaps the covering more than 10cm.

Assembly distance metal sheet

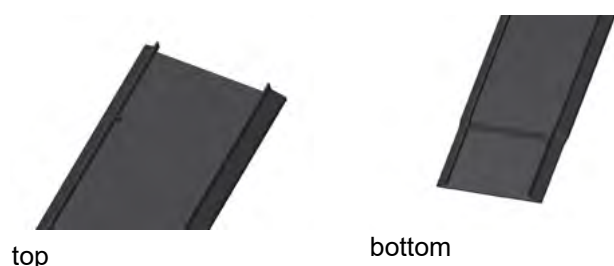
To completely replace the roof covering, there should be mounted intermediate plates. The intermediate plates have therefore included a functional effect on the collector system and are necessarily.

Distance metal sheets for the assembly in one row



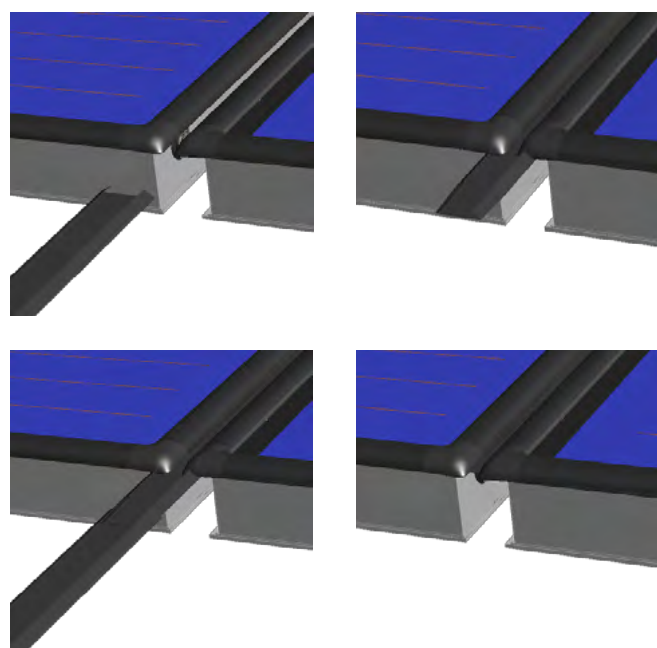
For the collector types FKF 200 V, FKF 240 V and FKF 270 V, two distance metal sheets are mounted in every gap between the collectors. For the collectors FKF 200 H, FKF 240 H and FKF 270 H, the assembly of one distance metal sheet is planned. In case of multi-row systems, the distance metal sheets are mounted as described. The distance metal sheets can be mounted from above or below.

Distance metal sheet



We recommend not to assemble the distance metal sheets at a high insulation or temperature. The potential thermal expansion of the collector may cause difficulties when assembling.

For vertical panels, there is a upper and lower intermediate plate.

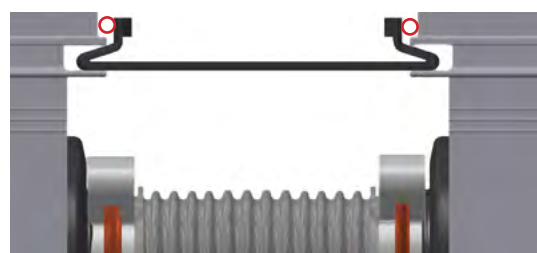


The distance metal sheet is inserted into the collector grooves from above/below. In case of vertical collectors or rather in case of multi-row assembly of the collectors, further distance metal sheets are inserted subsequently from above/below. The distance metal sheet has to be inserted until it lines up precisely with the lip (collector covering).

When assembling the distance metal sheets, please pay attention to the waterflow from the upper to the lower distance metal sheet.

1200531 Distance metal sheet FKF 200 V top
1200532 Distance metal sheet FKF 240 V top
1200533 Distance metal sheet FKF 270 V top
1200534 Distance metal sheet FKF 200 H / 240 H / 270 H top

1200535 Distance metal sheet FKF 200 V bottom
1200536 Distance metal sheet FKF 240 V bottom
1200537 Distance metal sheet FKF 270 V bottom
1200538 Distance metal sheet FKF 200 H / 240 H / 270 H bottom

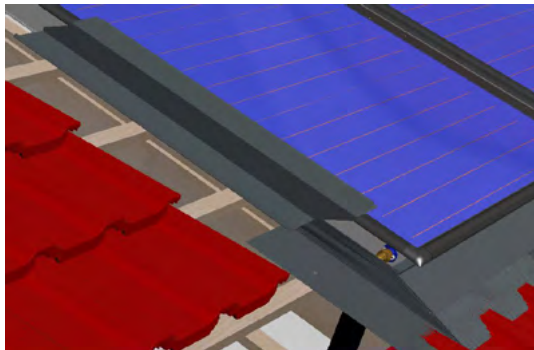


To avoid injury, it is recommended to use a piece of wood to push the distance metal sheets into the collector grooves.

The distance metal sheet will be stuck into the collector groove to protect it against slipping out. The silicone strip should have a length of 10 - 20 cm. Please note that the distance metal sheet must be free of silicone residue to ensure the flow of rainwater.

Assembly lateral sheet

Lateral sheets

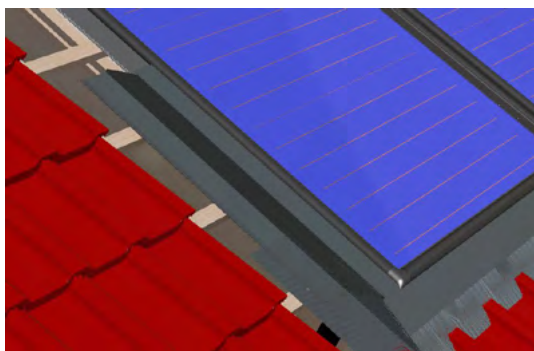


In the next step the lateral sheets will be mounted.

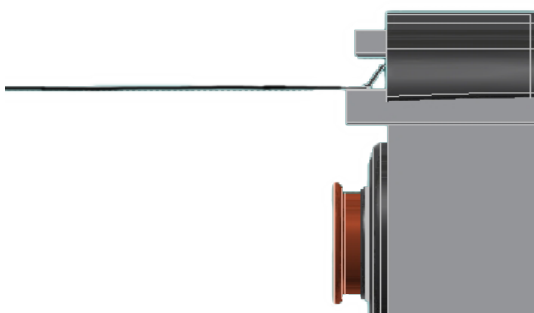
They are distinguished for the assembly on the right or the left side as well as for the lateral eaves sheet on the top or below.

In case of vertical collectors use two lateral sheets per row (left and right).

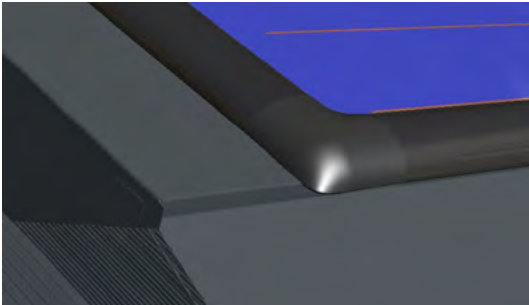
In case of horizontal collectors use one lateral sheets per row (left and right).



Start the assembly with the lower lateral sheet. Push it first on the lower end under the sealing profile into the groove of the collector profile and simultaneously into the corresponding eaves sheet edge.

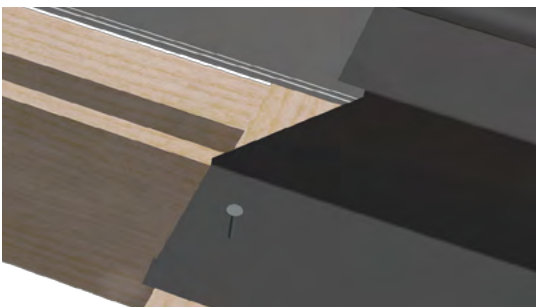
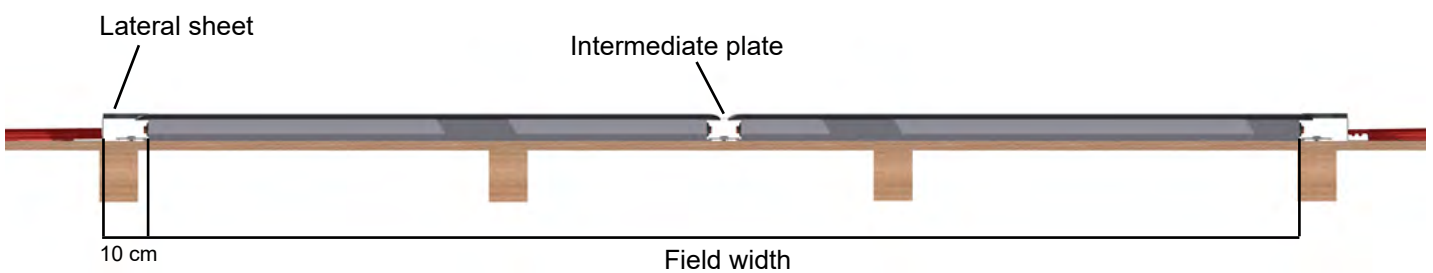


Assembly lateral sheet

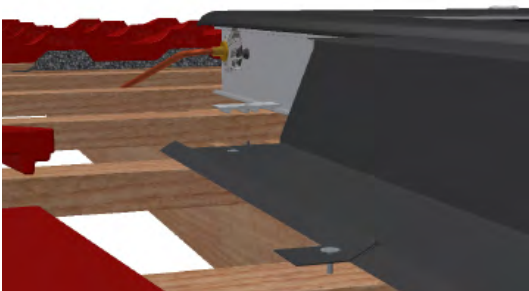


Pay attention that the lateral sheet is flush with the bent edge of the eaves sheet and that it is placed in the appropriate groove in the collector profile under the sealing lip (entire length).

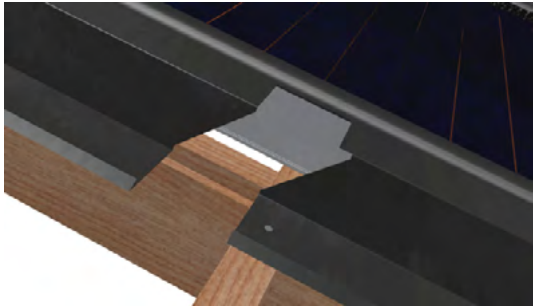
Before fixating the lateral sheet check if it is in a parallel position to the collector (10 cm).



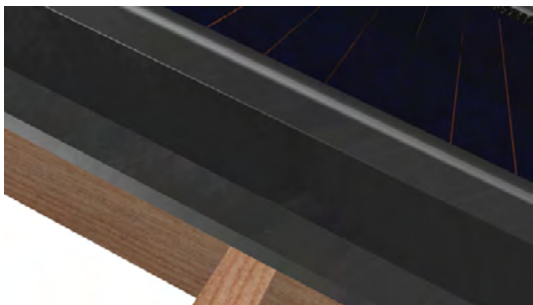
The lateral sheet is fixed with roof nails in the covering. The included fasteners (see figure besides) function as an extra protection and are not supposed to be mounted on or directly around the covering of the lateral sheet.



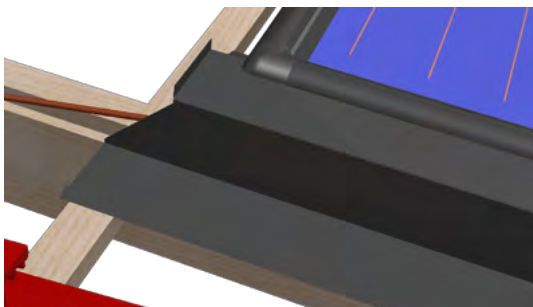
Assembly lateral sheet



Subsequently, the upper lateral sheet is mounted. Ensure that the lateral sheet is placed within the groove in the collector profile under the sealing lip (entire length).

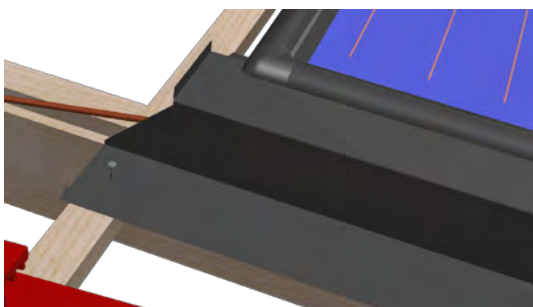


Push the upper lateral sheet in that way that the lower one is always overlapped.



Align the upper lateral sheet in that way that the seam is flush with the upper collector end.

Bend up the lateral sheet on the upper end according to the pre-cut slots at an angle of 90° and push it till the rubber lip.

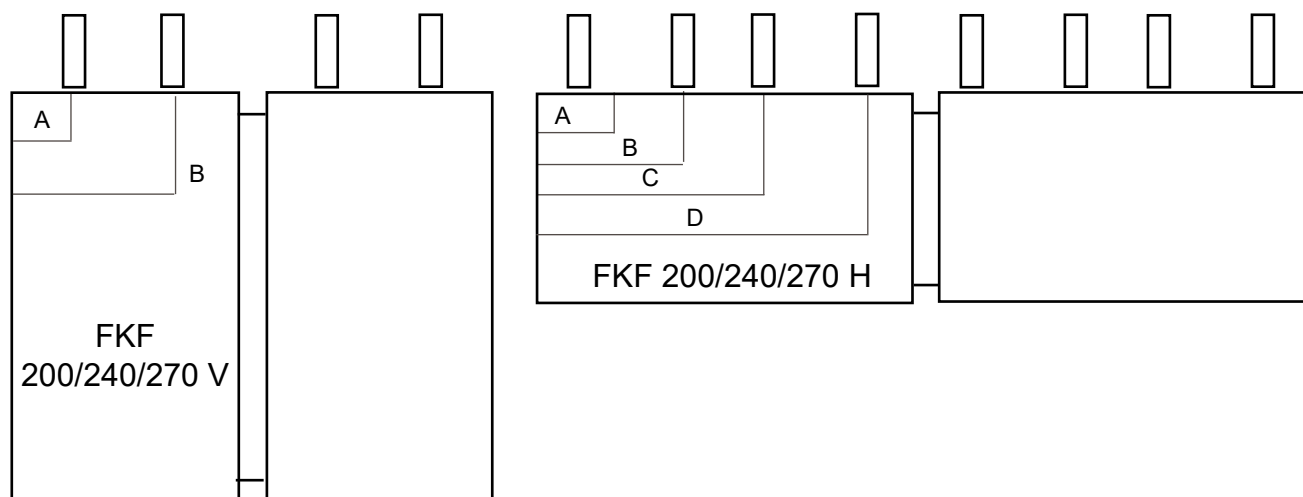


Fix the lower lateral sheet with the attached fasteners directly on the lath.

Now assemble the lateral sheets on the right side in the same order.

Assembly ridge sheet

Assembly dimensions support sheet & ridge sheet connection bottom part



Collector / Measure	A	B	C	D
FKF 200/240/270 V	400 mm	800 mm	-	
FKF 200 H	355 mm	710 mm	1.065 mm	1.420 mm
FKF 240 H	420 mm	840 mm	1.260 mm	1.680 mm
FKF 270 H	480 mm	960 mm	1.440 mm	1.920 mm



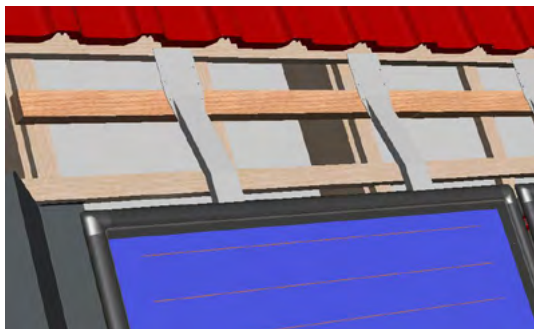
Before installing the ridge sheets, the support sheets have to be clicked into the groove of the collector profiles. Adjust the position of appropriate components according to the measures in the table above.

If there is no lath on the rest of the support sheets, install one additionally.



Fix the support sheet with the appropriate screws before mounting the ridge sheets.

Assembly ridge sheet



Completely pre-assembled support sheets and bottom parts of ridge sheets.

Start on the left side when mounting the ridge sheets.



First insert the ridge sheet on the left side into the left lateral sheet. Afterwards, the ridge sheet is pushed over the sealing lip.

Ensure that the support sheets are not slipping during the assembly.

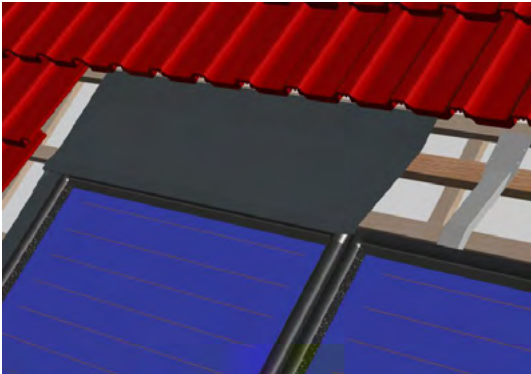


Completely mounted ridge sheet left.

Pay attention that the ridge sheet engages completely (audibly) over the EPDM-profile of the collector and that the lateral connection is pushed over the lateral sheet.

With a soft pressure on the ridge sheet border the sheet can completely be engaged over the EPDM-frame which is fully covered if the ridge sheet has been correctly installed.

Assembly ridge sheet



Completely mounted ridge sheet left.

The support sheets for the next collector are already mounted and fixed.



Insert the next ridge sheet in the previous one.

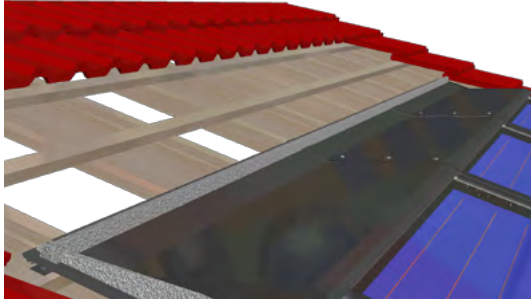
Proceed in the same way with every following collector. The last collector in a row has to be completed with the ridge sheet on the right side.



Completely mounted ridge sheet right.

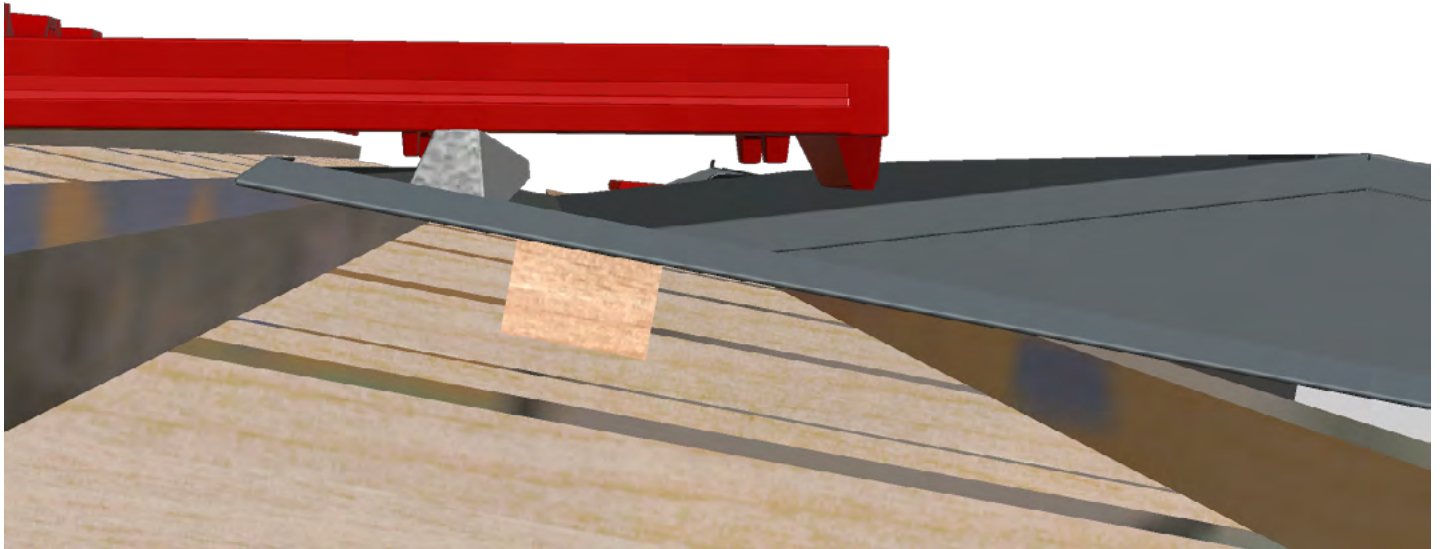
Pay attention that the ridge sheet engages completely (audibly) over the EPDM-profile of the collector and that the lateral connection is pushed over the lateral sheet.

Assembly ridge sheet



Finally, stick the supplied sealing wedges on the lateral and ridge sheets directly next to the seam. Ensure that the ground (sheet) is dry, dust and dirt free during the whole application!

Depending on the type of roof covering the application of the sealing wedges may not be necessary.



On the ridge sheet, the sealing wedge is positioned below the capstone in the fore third.

Pipe dimension of the connecting pipe

Recommended pipe dimension of the connecting pipe

Length of pipe F + BF Number of collectors	up to 10 m	from 10 m to 15 m	from 15 m to 20 m
2 coll. - 132 L/h	12 x 1	15 x 1	15 x 1
3 coll. - 198 L/h	15 x 1	15 x 1	15 x 1
4 coll. - 264 L/h	15 x 1	18 x 1	18 x 1
5 coll. - 330 L/h	18 x 1	18 x 1	18 x 1
6 coll. - 396 L/h	18 x 1	18 x 1	22 x 1
7 coll. - 462 L/h	22 x 1	22 x 1	22 x 1
8 coll. - 528 L/h	22 x 1	22 x 1	22 x 1
9 coll. - 594 L/h	22 x 1	22 x 1	22 x 1
10 coll. - 660 L/h	22 x 1	22 x 1	22 x 1
11 coll. - 726 L/h	22 x 1	22 x 1	28 x 1,5
12 coll. - 792 L/h	22 x 1	22 x 1	28 x 1,5
13 coll. - 858 L/h	22 x 1	28 x 1,5	28 x 1,5
14 coll. - 924 L/h	22 x 1	28 x 1,5	28 x 1,5
15 coll. - 990 L/h	22 x 1	28 x 1,5	28 x 1,5

The data refer to the plain tube. With corrugated pipe we recommend to choose the larger dimension!



Length of pipe F + BF Number of collectors	from 20 m to 25 m	from 25 m to 30 m	from 30 m to 35 m	from 35 m to 40 m
2 coll. - 132 L/h	15 x 1	15 x 1	15 x 1	15 x 1
3 coll. - 198 L/h	18 x 1	18 x 1	18 x 1	18 x 1
4 coll. - 264 L/h	18 x 1	18 x 1	18 x 1	22 x 1
5 coll. - 330 L/h	22 x 1	22 x 1	22 x 1	22 x 1
6 coll. - 396 L/h	22 x 1	22 x 1	22 x 1	22 x 1
7 coll. - 462 L/h	22 x 1	22 x 1	22 x 1	28 x 1,5
8 coll. - 528 L/h	22 x 1	22 x 1	28 x 1,5	28 x 1,5
9 coll. - 594 L/h	22 x 1	28 x 1,5	28 x 1,5	28 x 1,5
10 coll. - 660 L/h	28 x 1,5	28 x 1,5	28 x 1,5	28 x 1,5
11 coll. - 726 L/h	28 x 1,5	28 x 1,5	28 x 1,5	28 x 1,5
12 coll. - 792 L/h	28 x 1,5	28 x 1,5	28 x 1,5	28 x 1,5
13 coll. - 858 L/h	28 x 1,5	28 x 1,5	28 x 1,5	28 x 1,5
14 coll. - 924 L/h	28 x 1,5	28 x 1,5	28 x 1,5	35 x 1,5
15 coll. - 990 L/h	28 x 1,5	28 x 1,5	35 x 1,5	35 x 1,5

The data refer to the plain tube. With corrugated pipe we recommend to choose the larger dimension!



Pipe dimensions of the connecting pipe

Recommended pipe dimension of the connecting pipe

Length of pipe F + BF Number of collectors	from 40 m to 45 m	from 45 m to 50 m	from 50 m to 55 m	from 55 m to 60 m
2 coll. - 132 L/h	18 x 1	18 x 1	18 x 1	18 x 1
3 coll. - 198 L/h	18 x 1	18 x 1	18 x 1	22 x 1
4 coll. - 264 L/h	22 x 1	22 x 1	22 x 1	22 x 1
5 coll. - 330 L/h	22 x 1	22 x 1	22 x 1	22 x 1
6 coll. - 396 L/h	22 x 1	22 x 1	22 x 1	22 x 1
7 coll. - 462 L/h	28 x 1,5	28 x 1,5	28 x 1,5	28 x 1,5
8 coll. - 528 L/h	28 x 1,5	28 x 1,5	28 x 1,5	28 x 1,5
9 coll. - 594 L/h	28 x 1,5	28 x 1,5	28 x 1,5	28 x 1,5
10 coll. - 660 L/h	28 x 1,5	28 x 1,5	28 x 1,5	28 x 1,5
11 coll. - 726 L/h	28 x 1,5	28 x 1,5	28 x 1,5	28 x 1,5
12 coll. - 792 L/h	28 x 1,5	35 x 1,5	35 x 1,5	35 x 1,5
13 coll. - 858 L/h	35 x 1,5	35 x 1,5	35 x 1,5	35 x 1,5
14 coll. - 924 L/h	35 x 1,5	35 x 1,5	35 x 1,5	35 x 1,5
15 coll. - 990 L/h	35 x 1,5	35 x 1,5	35 x 1,5	35 x 1,5

The data refer to the plain tube. With corrugated pipe we recommend to choose the larger dimension!



Initial operation

Initial operation

After installing the other components such as flow pipe, return pipe, insulation, pump group, expansion tank and controller, the installation can be put into service. Perform a leak test and complete the commissioning log.

Protect the collectors from direct sunlight if the filling of the installation is not carried out within five days after completion of the assembly.

Inspections within the first two weeks of operation

- bleeding the solar circle
- control system pressure

Instructions for the operation of the installation

Carry out changes to the scheme and other system components only after consultation and with inputs from your specialized partner.

Ensure that an appropriate safety valve is mounted whose opening pressure is not exceeding the maximal operating pressure of the collectors.

Furthermore, do not install shut-off valves which may affect or prevent the function of the safety valve.

Carry out maintenance and inspections with appropriate caution.

Certain components may reach temperatures up to 200 °C. There is a risk of burns.

It is absolutely necessary to make sure that the back flow temperature is never lower than the ambient temperature. If necessary, take appropriate measures (e. g. increase of back flow temperature to at least 30 °C).

Regular inspections

Solar systems should be reviewed at intervals to be determined in addition to the function control by the operator.

The maintenance intervals of the system will be defined during commissioning.

An annual review is recommended. The following components must be checked for proper function (if installed):

- solar collectors
- solar circle
- heat transfer liquid
- solar storage
- solar regulator incl. circulation pump
- supplementary heating system
- expansion tank

Unscheduled maintenance

Depending on the location of the installation, environmental influences may cause soiling on the collector glass (dust, pollen etc.). If necessary, clean the glass exclusively with clear water to ensure optimal light transmission.

If it is necessary to free the system from snow or ice, only use non-metal cleaning equipment such as brooms with due care.

Only walk on roof areas in compliance with all safety aspects.

Heavy condensation may occur on the interior side of the glass when defrosting while the collectors are covered with snow. It is absolutely necessary to free the collectors from snow to avoid damages due to humidity.

Initial operation

Commissioning report									
System operator					Installer				
Street					Street				
Postcode/City					Postcode/City				
Material tick accordingly	Product (description)	Type (Serial N°)	Special feature Net surface	Material	Date of assembly				
Flat plate collector					Date of commissioning				
Piping									
Heat exchanger					Type of installation				
Storage 1			Content lit.		Roof-integrated				
Storage 2			Content lit.		Roof-mounted				
Solar regulation					Console				
Expansion tank			Content lit.	Safety valve	bar				
DrainMaster			Content lit.						
Collector adjustment south 0°, west +90°; east -90°)				Setting angle of collectors					
Height		Meter							
Setting value (Control value=*)		Type /Programme		Maximum temperature		Temperature difference		Hysteresis	
Consumer 1* = e.g. water for domestic use				°C		VL-RL		K	
Consumer 2* = e.g. 1. buffer store				°C		K		K	
Consumer 3* = e.g. 2. buffer store				°C		K		K	
Consumer 4* = e.g. swimming pool				°C		K		K	
Maximum temperatur of collector		°C	Solar protective function from		°C	Yes		No	
Operating pressure at		bar	System pressure expansion tank		Debit:	bar	Actual value:		
Heat transfer medium									
Visual check	normal/pink		brown		black		murky		
Type			Minimum value	Actual value	System		rinsed filtered bleeded		
Liquid capacity		pH-value							
Ratio		Frost protection							
General system checkpoints									
Collector clean		ok	Pumps tested on functionality					ok	
Stable collector fastening		ok	Temperature sensor shows realistic values					ok	
Collector not steamed up (interior)		ok	Grounding of the system					ok	
Non-return valve (not for DrainM.)		ok	Mixer - water for domestic use					ok	
Operating hours	Pump 1	h	Pump 2	h	Calorimeter /kWh				
Remarks:									

Initial operation

Schematic drawing of the system construction and piping scheme:

Initial operation

Schematic drawing of the system construction and piping scheme:

Initial operation

Notes

[illegible]

Initial operation

Notes

[illegible]

Appendix

Important to observe

Any guarantee and warranty for collectors as well as for resulting damages on the system or building expires due to unauthorized changes on the collectors and the accessories.

There is no guarantee or warranty due to optical or technical reduction or defects on the collector resulting from external influences, forasmuch as these influences are not part of the supplier's sphere or influence and they are not explicitly known before execution.

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