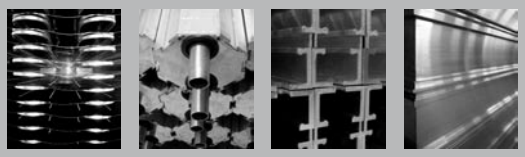
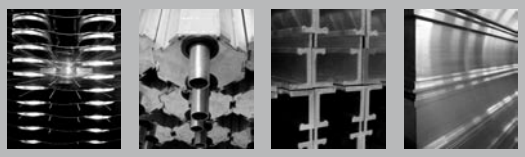


SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly Instructions
Solar collectors FKA 240/270

Roof-mounted installation



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

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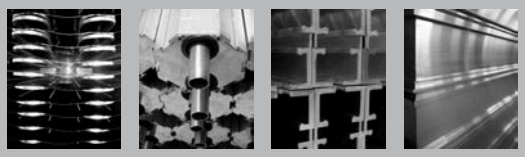
Please read these instructions carefully before beginning the assembly.

Observe the warnings indicated by this sign.
They warn of dangers or possibly erroneous actions, which may result to lapse of the warranty.

The collectors FKA 240 and FKA 270 are monitored according to the CEN-Keymark program rules Solarthermal Products and are certified with the registration numbers 011-7S154F and 011-7S832F.

The STI GmbH is obliged to take back with the environmental label RAL-UZ-73 for solar collectors („Blauer Engel“) labeled products, and to consign it to recycling.



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Safety regulations, instructions and guidelines

Engineer standards and guidelines

- VBG 4 Unfallverhütungsvorschriften Elektrische Anlagen und Betriebsmittel
- VBG 37 Unfallverhütungsvorschrift Bauarbeiten
- VBG 74 Leitern und Tritte
- ZVDH, Regelwerk (Stand Juni 2001)
- LBO's Landesbauordnungen der Bundesländer
- DIN 18299 Allgemeine Regelung für Bauarbeiten jeder Art
- DIN 18334 Zimmer- und Holzbauarbeiten
- DIN 18338 Dachdeckungs- und Dachabdichtungsarbeiten
- DIN 18339 Klempnerarbeiten
- DIN 18351 Fassadenarbeiten
- DIN 18360 Metallbauarbeiten, Schlosserarbeiten
- DIN 18381 Gas-, Wasser- und Abwasser-installationsanlagen
- DIN 18451 Gerüstarbeiten
- DIN 1055 Lastenannahme für Bauten Teil 1-5
- DIN 1988 Teil 1-8 Technische Regeln für die Trinkwasserinstallation
- DIN 4708 Teil 3 Zentrale Brauchwasser-erwärmungsanlagen
- DIN 4102 Brandverhalten von Baustoffen und Bauteilen
- DIN 4109 Schallschutz im Hochbau
- HeizAnlVO Heizungsanlagenverordnung
- ZVH - Richtlinie 11.01 Einbindung solartechnischer Anlagen in die Hauswärmeversorgung
- TRD 802 Dampfkessel der Gruppe III
- TRD 402 Ausrüstung von Dampfkesselanlagen mit Heißwassererzeugern der Gruppe IV
- ENV 1991-2-3-4 Grundlagen der Tragwerksplanung und Einwirkung auf Tragwerke – Schneelasten und Windlasten
- DIN EN 516 Einrichtungen zum Betreten des Daches
- EN 517 Sicherheitsdachhaken
- DIN 4751 Teil 1: Wasserheizungsanlagen: Offene und geschlossene physikalisch abgesichterte Wäremeerzeugungsanlagen bis 120°C - Sicherheitstechnische Ausrüstung
  Teil 2: Wasserheizungsanlagen: Geschlossene, thermostatisch abgesicherte Wärmeerzeugungs-anlagen mit Vorlauftemperaturen bis 120°C - Sicherheitstechnische Ausrüstung
  Teil 3: Wasserheizungsanlagen: Geschlossene, thermostatisch abgesichterte Wärmeerzeugungsanlagen mit 50 kW Nennwärmeleistung mit Zwangumlauf-Wärmeerzeugern und Vorlauftemperaturen bis 95°C - Sicherheitstechnische Ausrüstung
- DIN 4753 Teil 1 Wassererwärmer und Wassererwärmungsanlagen für Trink- und Betriebswasser;Anforderungen, Kennzeichnung, Ausrüstung und Prüfung
- DIN 4757 Teil 1: Sonnenheizungsanlagen mit Wasser und Wassergemischen als Wärmeträger; Anforderungen an die Sicherheitstechnische Ausrüstung

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 0100-725 Errichten von Starkstromanlagen mit Nennspannungen bis 1000 V; Hilfsstromkreise
- DIN VDE 0100-737 Errichten von Niederspannungsanlagen - Feuchte und nasse Bereiche und Räume und Anlagen im Freien
- DIN VDE 0105-100 Betrieb von elektrischen Anlagen
- DIN VDE 0185-1, DIN 57185-1 Blitzschutzanlage, Allgemeines für das Errichten
- DIN VDE 0190 Einbeziehung von Gas- und Wasserleitungen in den Hauptpotentialausgleich
- VDE 0855-1, DIN 57855-1 Errichtung und Betrieb (Erdung) von Antennenanlagen

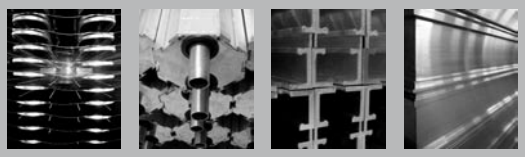
Connection of solar thermal systems

- EN 12976: Thermische Solaranlagen und ihre Bauteile (vorgefertigte Anlagen)
- ENV 12977: Thermische Solaranlagen und ihre Bauteile (kundenspezifisch gefertigte Anlagen)
- DIN 1988: Technische Regeln für Trinkwasser-Installation (TRWI)

Notes before starting assembly

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 yourself about the local engineer standards and regulations.
Components of the collectors can reach temperatures over 50 °C, there is a danger of burning and scalding!
Please check whether there are any load sources in the area of the collector field that may produce chemically aggressive medium.
In condensate dissolved acids and bases can 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 as security against the ingress of moisture due to rain or snow additional measures (eg sarkings) - especially in case of extended and occupied top floors or in case of too less roof pitch (concerning the covering).



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Safety regulations, instructions and guidelines

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

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

Recommended heat transfer medium is a mixture of glycol and water. The collectors may never be operated or tested under pressure with water.

To protect the system of overheating during standstill and accelerated glycole-aging a self-draining system (e.g. STI Drain Master or Drain Box) is recommended.

It is absolutely 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).

Lightning protection

Note country-specific legislation!
Throughout the installation of metal fastening, a check is needed by an authorized qualified electrician.

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

Please ensure sufficient ventilation for each assembly method. Do not close the ventilation openings. Especially in case of roof-integrated assembly, the ventilation of the collector is definitely necessary. Appropriate ventilation hoods are available from the supplier. 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.

Responsibilites

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

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

This instruction is not subjected to the control of a service of modifications. It does not absolve the manufacturer and operator of the installation of his responsibilities to install and operate all parts of the installation according to utmost professional knowledge. The manufacturer of the installation is responsible to observe and keep all appropriate regulations and instructions.

Statics

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

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

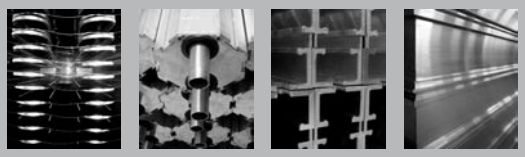
According to DIN 1055 part 4 and 5 or rather according to the local engineer standards it is necessary to check on site the whole collector installation, especially in snowy regions (note: 1 m² powder snow ~ 60 kg / 1 m² wet snow ~ 200 kg) as well as in regions with high wind speed. Before starting the assembly all aspects that may lead to incorrect load of the whole construction have to be considered!

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

In case of correct assembly snow loads up to 2 kN/m² and wind loads up to 80 km/h (inland up to 10 meters height of buildings) on the collectors are permissible.

For transport and stocking

Never abandon the delivered collectors unprotected at the building site. Never lay down the collectors onto a rough surface with overhanging pieces like stones, timbers, etc.
Stock the collectors always upright leaning against a solid surface.
The rigidity of the collectors is limited. During transport to the building site always ensure a torsion-free transport type. In case of an elevated intermediate storage make sure that the collectors are protected against sliding down.

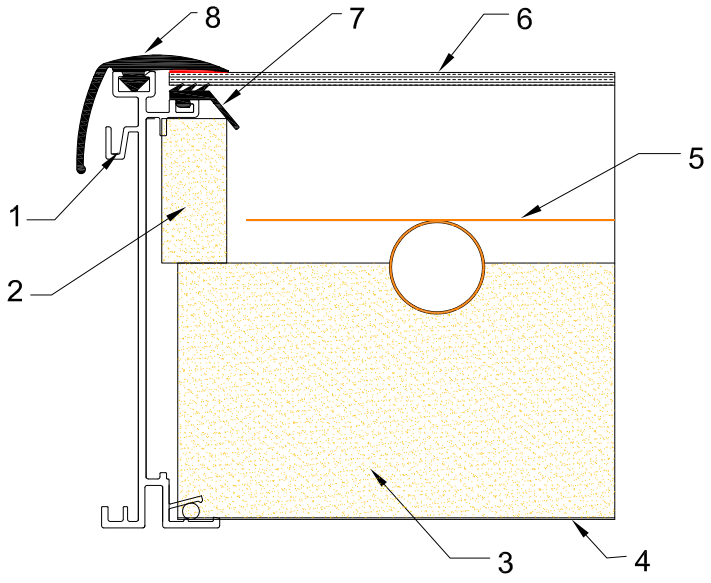


SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Product description

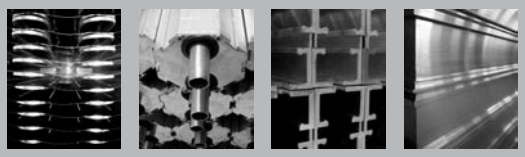
Solar collector FKA

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



Sectional model

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



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Product description

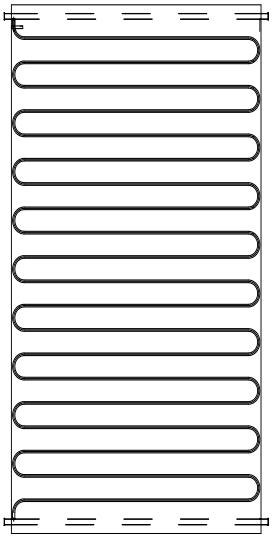
Specifications

The FKA collector has a pure copper 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.

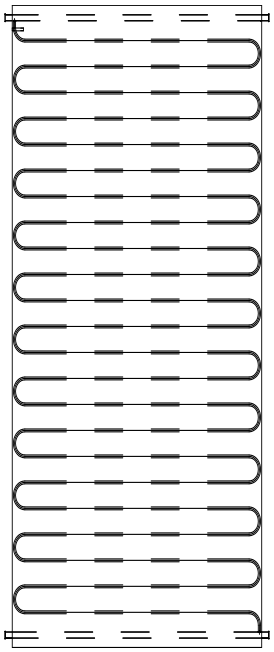
Model FKA	**240 V**	**270 V**	**240 H**	**270 H**
Gross surface	2.52 m^2	2.85 m^2	2.52 m^2	2.85 m^2
Net surface	2.20 m^2	2.50 m^2	2.20 m^2	2.50 m^2
Length	2,100 mm	2,380 mm	1,200 mm	1,200 mm
Width	1,200 mm	1,200 mm	2,100 mm	2,380 mm
Height	110 mm	110 mm	110 mm	110 mm
Test pressure	10 bar	10 bar	10 bar	10 bar
Operating pressure	6 bar	6 bar	6 bar	6 bar
Fluid volume	2,2 l	2.4 l	2.7 l	3.1 l
Flow per m^2	15 - 40 l/h	15 - 40 l/h	15 - 40 l/h	15 - 40 l/h
Weight	42 kg	54 kg	42 kg	54 kg
Loss of pressure (T=20°C / 30l/h)	3,272 Pa		3,272 Pa	

Hydraulic system of the absorber

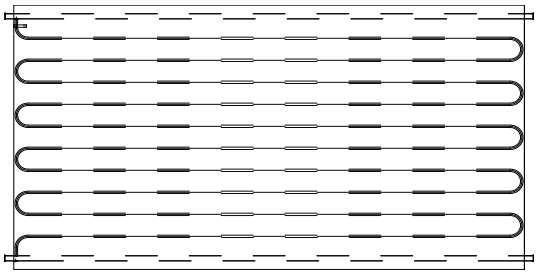
FKA 240 V



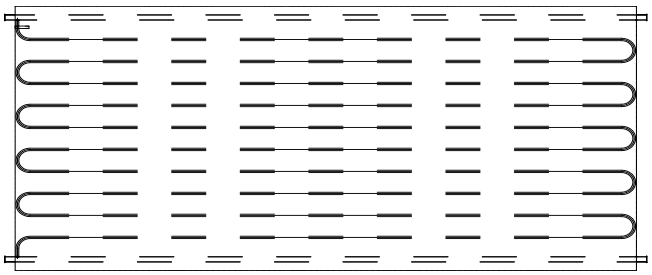
FKA 270 V

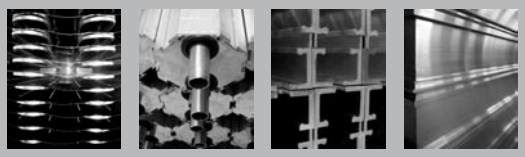


FKA 240 H



FKA 270 H

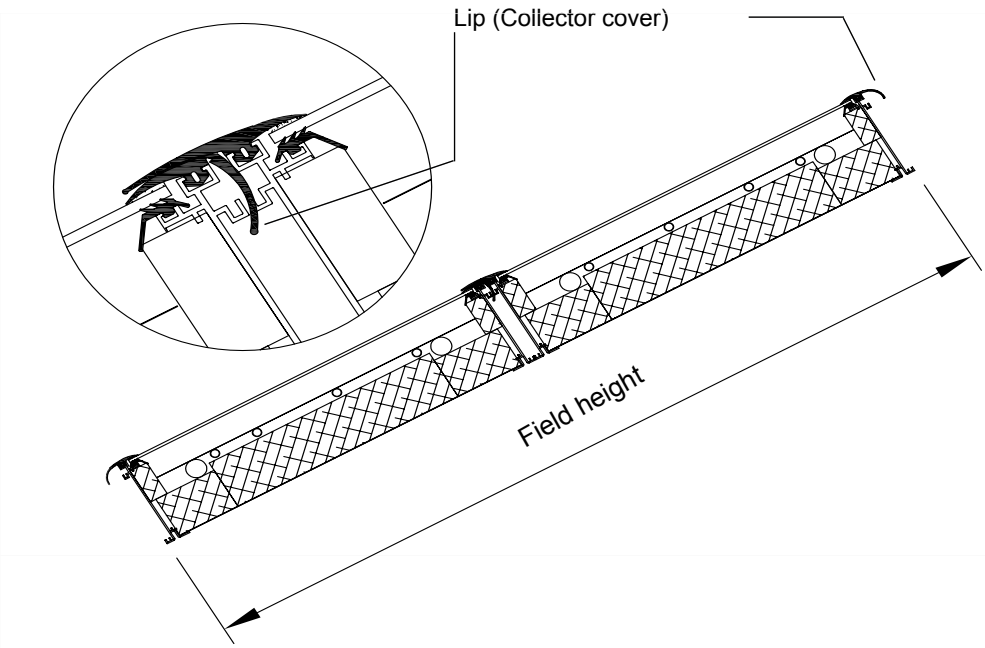




SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

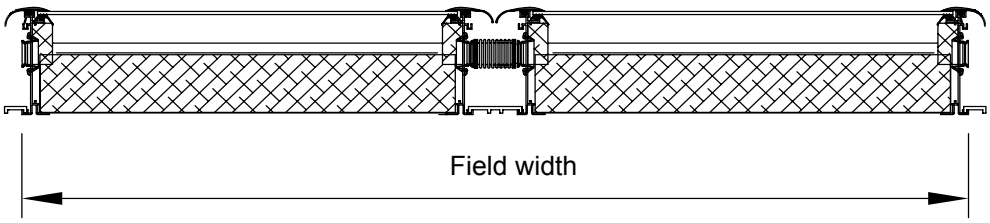
Collector field dimensions

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 cover) of the upper collector has to be put onto the lower collector. The lip (collector cover) of the lower collector has to be clamped in the joint area so that an optimum water flow is ensured.

Horizontal section across a collector field

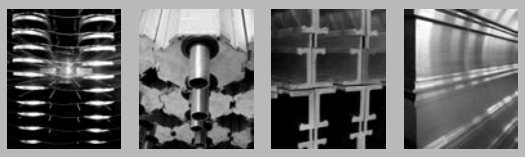


Collectors that are mounted side by side in one row are always connected by means of stainless steel expansion joints on the manifolds. (view photo)

It is possible to assemble metal sheets between the collectors to achieve a homogeneous appearance of the installation. The distance metal sheets are assembled exclusively for optical aspects and do not have any influence on the installation. Therefore the distance metal sheets can be ordered optionally and are not necessarily included in delivery.

Tighten the screw on the clamp only manually. The usage of cordless screwdrivers or the like may lead to damages of the thread of the clamp. Tighten the clamp until the two lugs are superimposed in the whole length.

1300001 Collector connection set hydraulical
1910001 Tool set



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Collector field dimensions

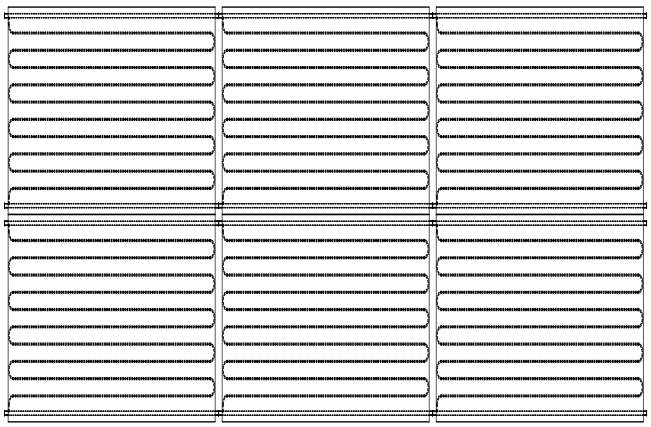
Collector type

240 V	Number of collectors	1	2	3	4	5	6	7	8	per 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	per 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

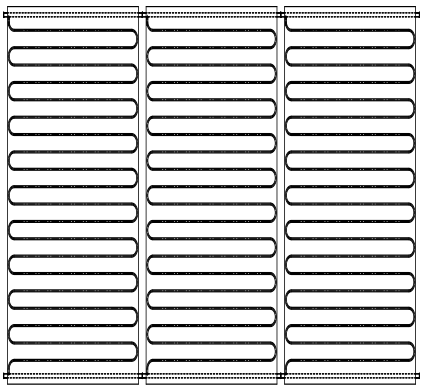
270 V	Number of collectors	1	2	3	4	5	6	7	8	per each additional collector
	Field width in mm	1,167	2,387	3,607	4,827	6,047	7,267	8,487	9,707	+ 1,220
	Number of rows	1	2	3	4	5	6	7	8	
	Field height in mm	2,340	4,680	7,020	9,360	11,700	14,040	16,380	18,720	+ 2,340

270 H	Number of collectors	1	2	3	4	5	6	7	8	per 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



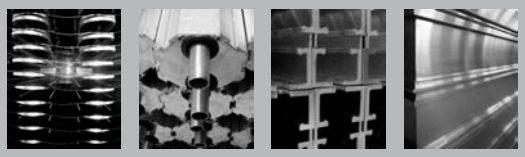
Example
Six collectors FKA 240H in two rows

Field width: **6,307 mm**
Field height: **2,334 mm**



Example
Three collectors FKA 240V in one row

Field width: **3,607 mm**
Field height: **2,067 mm**



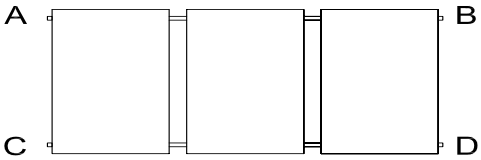
SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Hydraulic connections

Temperature sensor

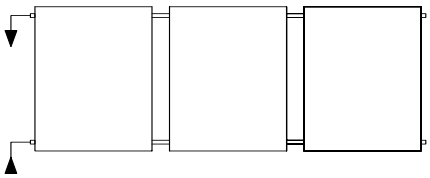
Each collector has a sleeve for inserting a temperature sensor. The sleeve is directly connected with the absorber. If the collectors are installed correctly, the sleeve is always located on the top of the collector on the left. The temperature sensor can be inserted in any collector. Please secure it 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

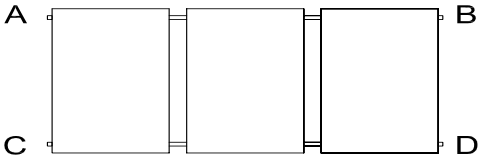


Connection F red A or B
Connection BF blue, C or D

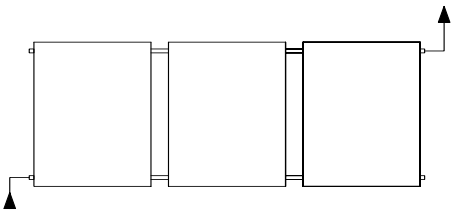
Close unused connections with caps.



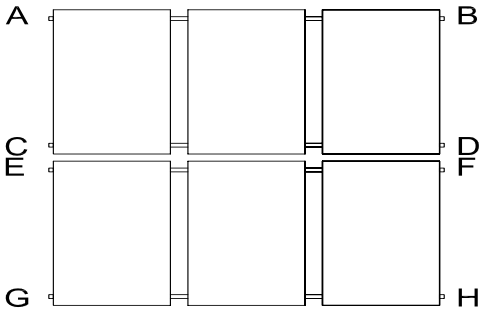
Installations with seven up to 15 collectors in one row



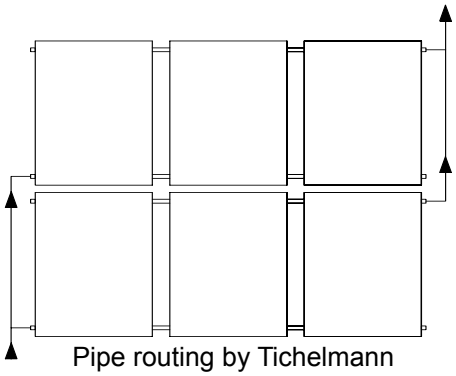
Connection bottom left / at the top of the right
BF = C / F = B
Connection at the top of the left / bottom right
BF = D / F = A



Multi-row installations



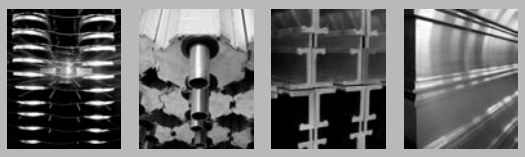
Connection F A + E / B +F
Connection BF G + C / H + D
Close unused connections with caps.



Pipe routing by Tichelmann

In case of installations in two rows that are smaller than 15 m² the connection pipe can be connected to the extern manifold in any direction from the bottom or the top. In case of installations with more than two rows or larger than 15 m² the connection pipe must always be connected to the diagonal line to the extern manifold (Tichelmann), e.g. from botton left to the top of the right.

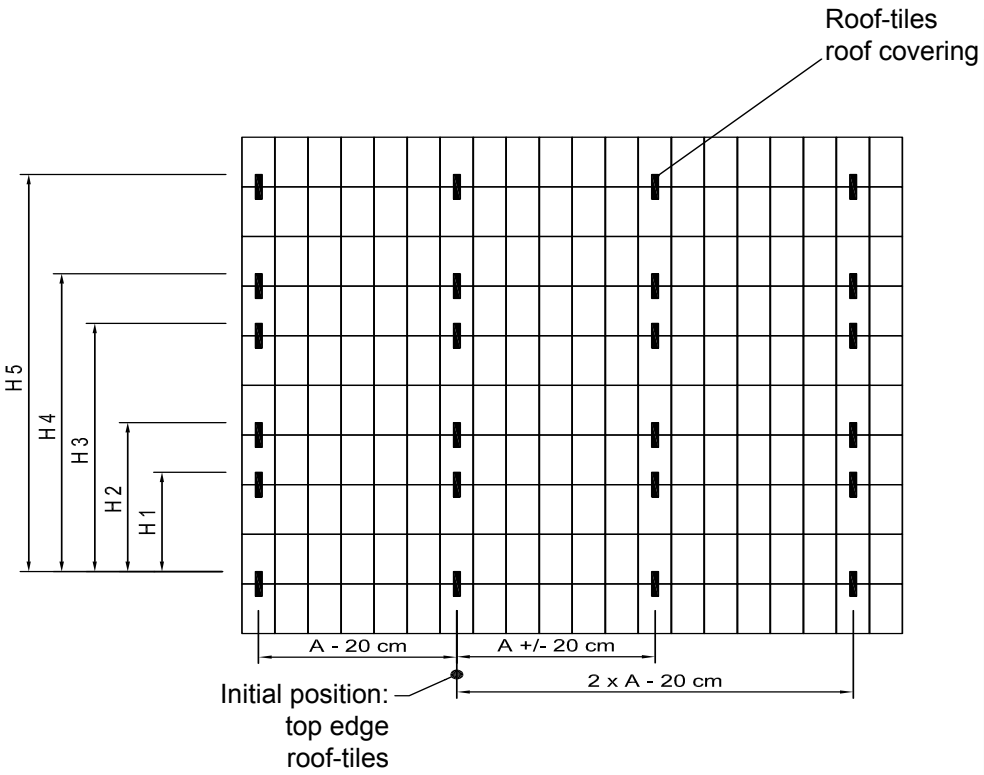
F=Flow (collector to storage) red grommet
BF=Backflow (storage to collector) blue grommet
In case of installation of an air eliminator, install it at the opposite end of the top flow connection!



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Spacing multi-row collector fields

Distance measures roof-tiles



For each collector row two rows roof-tiles are necessary.

The vertical sizes H1 to Hn are each taken on the top edge of the roof-tiles.

The measures for installation of the roof-tiles are obligatory. Otherwise, the hydraulic collector connection may be lying at the height of the mounting profile, making it difficult to fasten the collectors on the profile.

1410002 Roof-tile bracket V2

..

..

..

1410009 Roof-tile bracket flat roof-tile with lead 30 mm battens

Horizontal size	FKA 240 H	FKA 240 V	FKA 270 H	FKA 270 V
Measure A	212 cm	122 cm	239.3 cm	122 cm

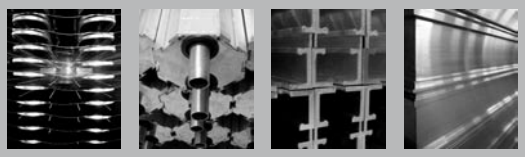
Vertical size Tolerance	FKA 240 H + / - 10 cm	FKA 240 V + / - 10 cm	FKA 270 H + / - 10 cm	FKA 270 V + / - 10cm
Measure H1	97 cm	187 cm	97 cm	214 cm
Measure H2	137 cm	227 cm	137 cm	254 cm
Measure H3	214 cm	394 cm	214 cm	448 cm
Measure H4	254 cm	434 cm	254 cm	488 cm
Measure H5	331 cm	601 cm	331 cm	682 cm
x	117 cm	207 cm	117 cm	234 cm

The next series is given by:
Hn = Hn - 2 + x
n is the number of the row of roof-tiles to be calculated

example FKA 240 H

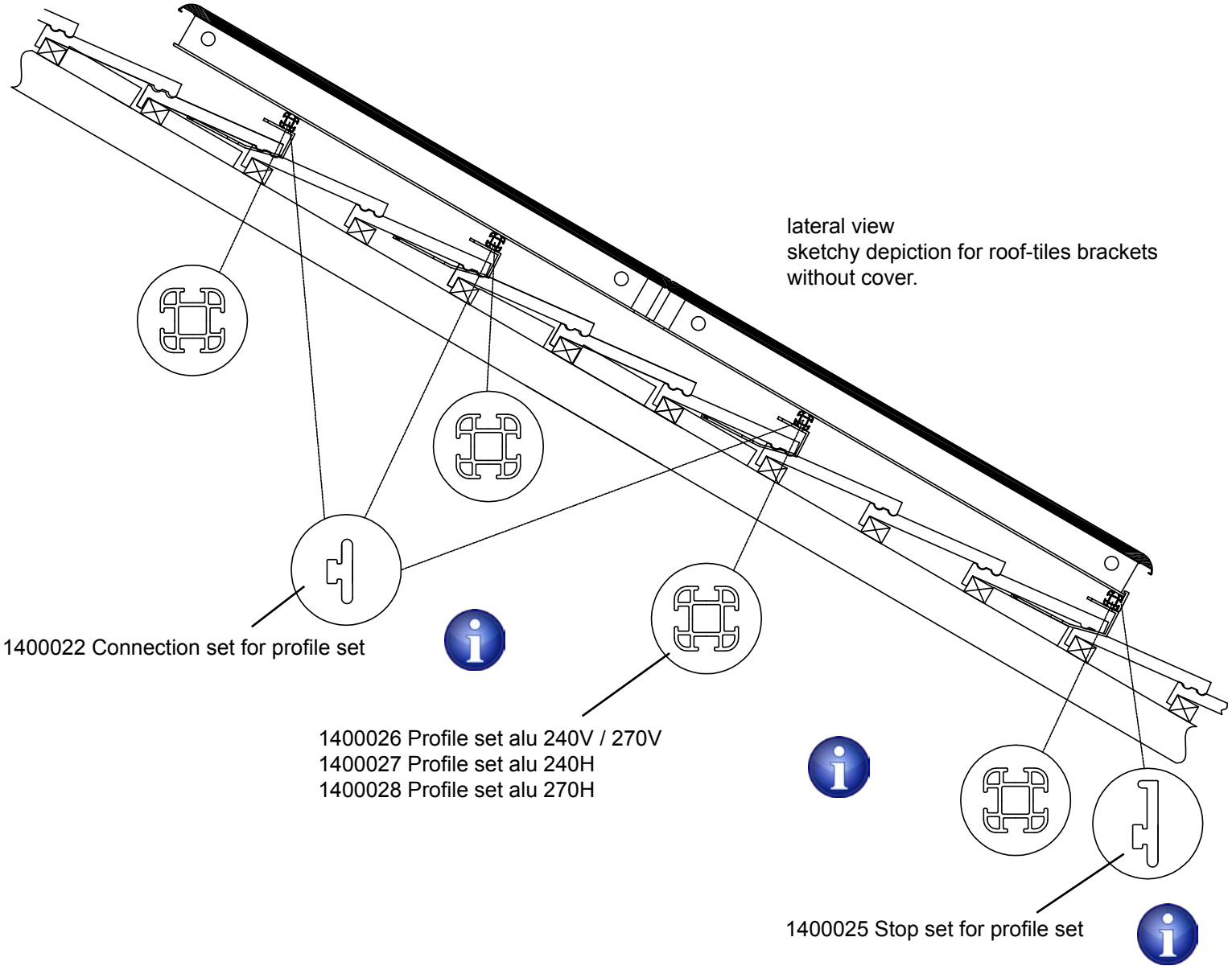
H6 = H6 - 2 + x
H6 = H4 + x (Height H4 see table)
H6 = 254 cm + 117 cm
H6 = 374 cm

If high snow loads are to be expected, the roof-tiles have to be mounted above the rafters (in other words the support must lie on the rafter / alternatively, a higher number of roof-tiles may be considered, depending on load).



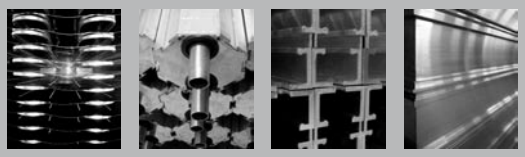
SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Roof-mounted installation on roof-tiles



For roof-mounted installations one profile set alu 1400026, 1400027 or 1400028 (depending on the collector type) as well as one stop set for profile set 1400025 are deliverd for each collector. If several collectors are mounted in one row, for each collector crossing one connection set for profile set 1400022 is necessary.
In case of multi-row systems only in the lowermost row the stop set for profile set 1400025 is used. In the other rows the collectors are lying on top of each other.

The stop set is to be mounted so that it is fastened dented at maximum 20 cm from the outer edge of the collector.



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly roof-tile clamps

Completely tiled roof.

When mounting the field in regions with snow load zone III and higher or with expected increased snow loads, it is necessary to place the roof hooks in the rafter area.

Removal of the tiles after previous determination of the placement of the roof-tile clamps (see page 10 „Spacing multi-row collector fields“).

Fixation of the lower lath 24x80x600 mm with two screws 5x60 mm.

If the lath is placed near the counter lath, the lath 24x80x600 mm must not be applied.

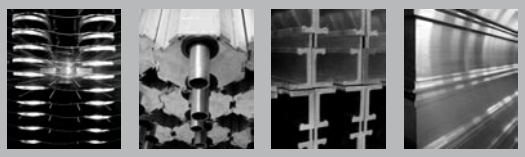
1410002 Roof-tile clamp V2 without lead

The lower roof-tile must be remounted.

Before covering the lower roof-tile must be coarsly ground.
To avoid breaking of the tile the roof-tile clamp must not rest on the tile.

The lower tile must be coarsly ground so that the roof-tile clamp rests in the middle of the tile.

Mount the tile clamp support 80x270x30 mm and fix it with two screws 5x60 mm.



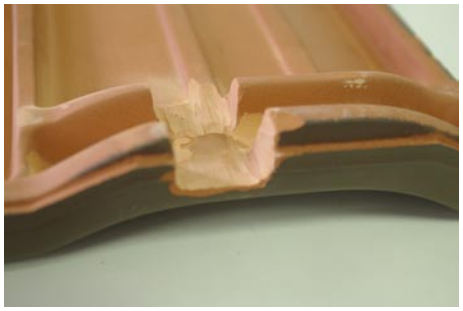
SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly roof-tile clamps

In addition to the grinding of the roof-tile we recommend to use a screw that is mounted on the roof-tile clamp support as distance saver.

Finished mounting of screw as distance saver.

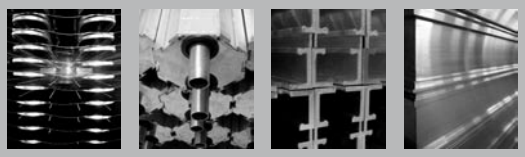
Fix the roof-tile clamp with the support 50x150x5 mm using two screws 5x60 mm.



Before roofing the covering tile has to be coarsly ground accordingly.

Complete covered roof-tile clamp after covering.

Further roof-tile clamps in one row must be adjusted exactly (e.g. by a line mark)



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly roof-tile clamps with lead

Completely tiled roof.

Removal of the tiles after previous determination of the placement of the roof-tile clamps (see page 10 „Spacing multi-row collector fields“)

When mounting the field in regions with snow load zone III and higher or with expected increased snow loads, it is necessary to place the roof hooks in the rafter area.

Completely lifted area for placement of a hook.

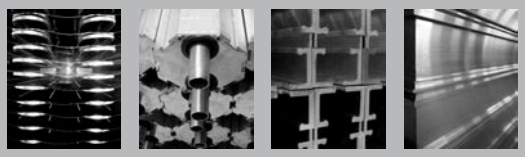
Mount the lower lath 24x80x600 mm with two screws 4x50 mm.

If the lath is placed near the counter lath, the lath 24x80x600 mm must not be applied.

1410002 Roof-tile clamp V2 with lead

Replace the lower roof-tile.

Afterwards the tile clamp support 24x150x270 mm is to be fixed with two screws 6x60 mm.



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly roof-tile clamps with lead

Place the first mounting tab so that the lower tile is covered. Additionally make sure that the mounting tab is put sideways under the adjacent tiles (bend up mounting tabs sidewise).

Mount the roof-tile clamps without covering the lower tile.

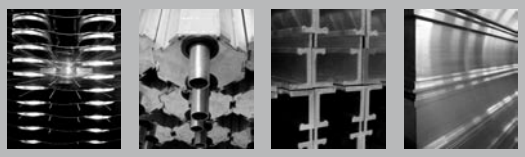
The roof-tile clamp must not cover the lower tile. Otherwise, a pressure point on the lower tile may arise.

Mount the upper mounting tab. Bend it up sidewise. The screws of the roof-tile clamp must be covered.
Protect the mounting tab against slipping.

The added foam wedge is placed under the adjacent tiles on both sides as well as above (protection against splash water and snow).

Completely mounted roof-tile clamp.

Further roof-tile clamps in one row must be adjusted exactly (e.g. by a line mark)



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly plain tile clamps without lead

Use the roof-tile for roof-mounted installation for plain tile roof covering also for slate, shingle and prefa covering.

Fixation of the lower lath 24x80x600 mm with two screws 4x50 mm.

If the lath is placed near the counter lath, the lath 24x80x600 mm must not be applied.

Adjust the roof-tile laterally so that only one tile must be coarsly ground. Place the hook so that there is enough space for a covering tile to avoid grinding.
The tile clamp is fixed with two screws 5x60 mm.

The roof-tile clamp may not rest or rather cause pressure points on the tile.

If the tile clamp is mounted too low, the added 5 mm timbers can be placed under the tile clamp.

When mounting the field in regions with snow load zone III and higher or with expected increased snow loads, it is necessary to place the roof hooks in the rafter area.

Covering of tile laterally.

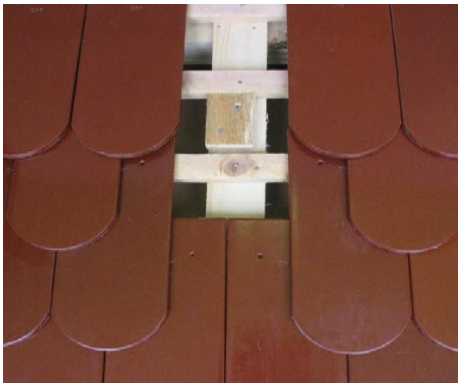
Grinding and covering of the tile.

Covering of the remaining tiles.

Further roof-tile clamps in one row must be adjusted exactly (e.g. by a line mark)

1410004 Roof-tile clamp V2 plain tile without lead

Assembly plain tile clamps with lead



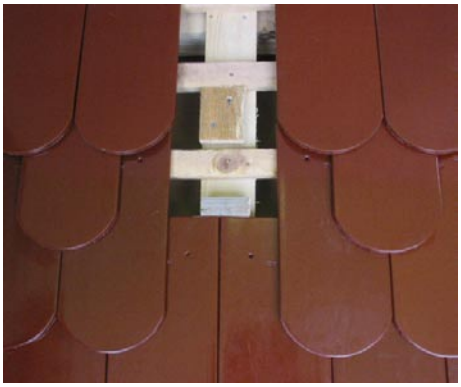
Fixation of the lower lath 24x80x600 mm with two screws 4x50 mm.

Assembly of the upper tile clamp support 100x80x25 mm with two screws 5x60 mm.

When mounting the field in regions with snow load zone III and higher or with expected increased snow loads, it is necessary to place the roof hooks in the rafter area.

Assembly of the lower tile clamp supporte 80x50x45 mm with two screws 5x60 mm.

Timber excess length of 5 mm (timber is higher than tile).



Completely mounted timber supports.

Mount the lower lead sheet while placing the lead laterally under the tiles.

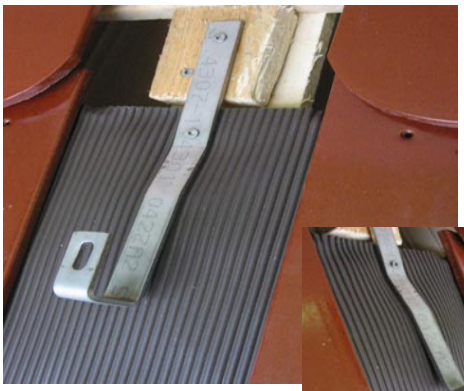
Pay attention that the corners are bent under the tile on both sides.

1410002 Roof-tile clamp V2 plain tile with lead

Assembly plain tile clamps with lead

Fixation of the roof-tile clamp with two screws 5x60 mm.

Screw the lower one into the tile lath and the upper one into the tile clamp support.



Completely mounted roof-tile clamp with lower lead sheet.

The tile clamp must have a minimum distance to the underlying tile of 5 mm.

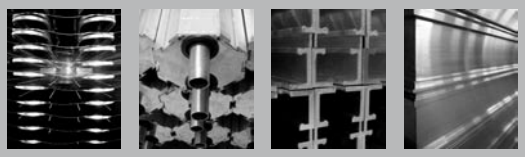
Mount the upper lead sheet while placing the lead laterally under the tiles.

Pay attention that the corners are bent under the tile on both sides. See assembly lower lead sheet.

Covering of the upper tiles.

Completely mounted roof-tile clamp.

Further roof-tile clamps in one row must be adjusted exactly (e.g. by a line mark)



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly roof-tile clamp corrugated

The placement of the roof-tile clamps corrugated is determined according to page 10.

Pay attention that the clamps are placed near an existing mounting lath.

The holes for the fixation screws have to be pre-drilled with a 8 mm borer.

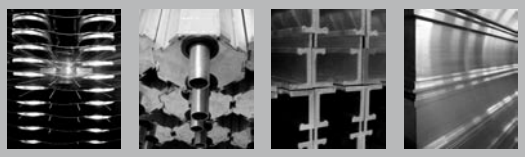
The fixation of the clamps is realised by façade screws 6,5x100 mm with sealing gasket.

Depending on the width of the substructure underneath the corrugated roof covering the roof clamp can additionally be fixed with a second fastening screw.

Completely mounted roof clamp ready for assembly of fastening profiles (see page 20).

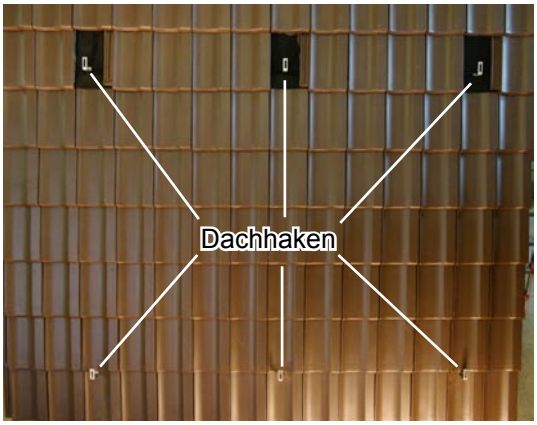
If the roof clamps cannot be mounted within the limits indicated on page 10, you first have to mount horizontal or vertical STI system profiles onto the roof clamp. Afterwards the added fastening profiles are mounted.

1410001 Roof-tile clamp corrugated V2



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly mounting profiles



Readily mounted tile clamps for one collector field with two collectors.

Top: Tiles left out and clamp set with mounting tabs assembled

Bottom: Tiles coarsly ground and clamps assembled without mounting tabs

Place the T-head screws laterally into the profile into any groove.

1400026 Profile set Alu 240V and 270V or
1400027 Profile set Alu 240H or
1400028 Profile set Alu 270H

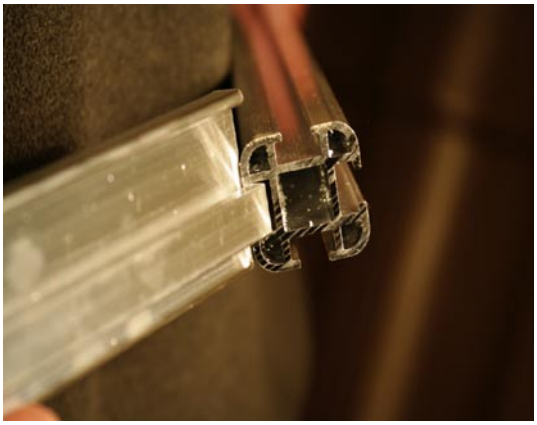
1400024 Fastening set for profile set on roof hooks (4 fast. pts.)

for every additional collector in one row
1400023 Fastening set for profile set on roof hooks (2 fast. pts.)

Fix the T-head screw with the washer and the nut after putting it through the slot.

Do not exceed the T-head screw‘s tightening torque of 27 Nm.

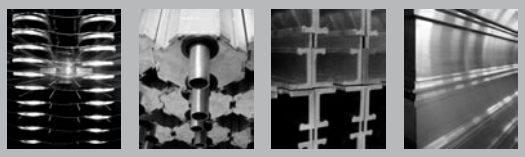
The slots in the hooks are for evening out bumps. The fastening of the profile must be realised in the upper third of the slot.



At an angle of 90° to the T-head screw the stop sets are put into the groove; protruding side up. For each collector there are two 5 cm long stop profiles. The fixation is effected, each time indented maximal 20 cm from the end of the collector.

Only in the lowest row the stop profiles are supplied and assembled.

1400025 Stop set for profile set



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

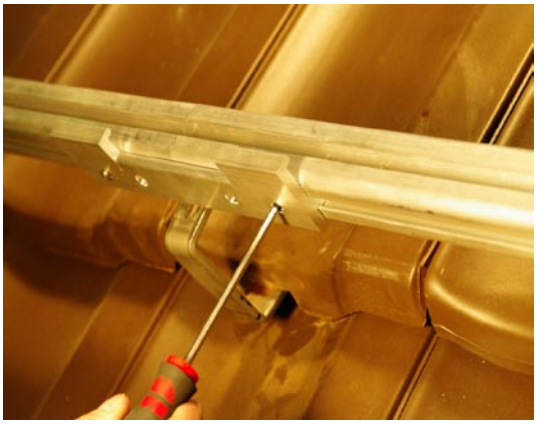
Assembly mounting profiles

In the border area of the fastening profile to be mounted the connection profile has to be put in and centered; also at an angle of 90° to the T-head screw.

1400022 Connection set for profile set

Before fixing the connection profile, the next fastening profile with preassembled collector edge is mounted.

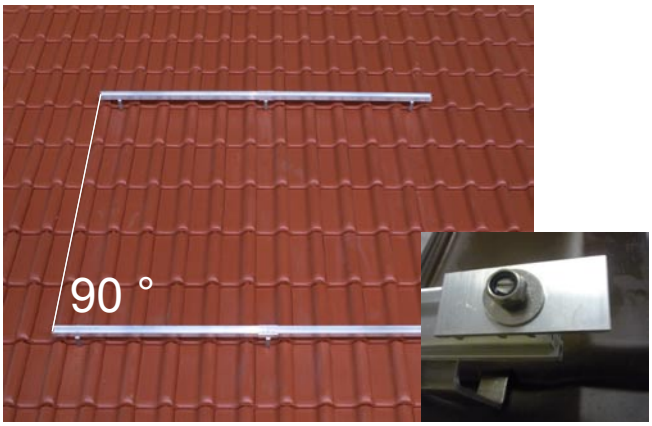
1910001 Tool set



Before joining the fastening profiles and connecting them with the connection profile, the correct position is to be checked (level, line mark). Subsequently, fix all setscrews M8x12 mm (connection set and stop set).

The stop sets are only mounted in the lowest profile row.

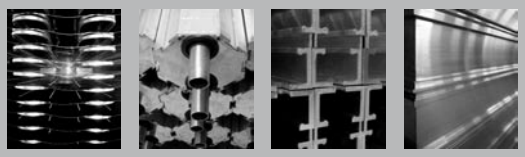
Mount the stop profile; fastened each time indented maximal 20 cm from the outer edge of the collector.



Completely mounted fastening profiles ready for assembly of the collectors.

Pay attention to alignment of the profile rails.
Insert the preassembled clamping plate for fastening of the collectors into the upper as well as into the lower fastening profile.

1400021 Collector fastening set profile

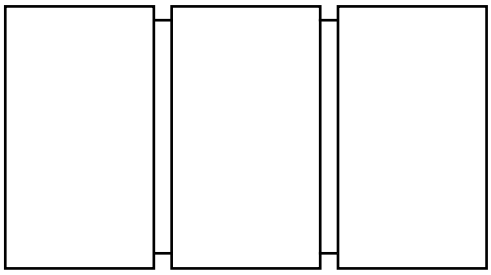


SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly collectors

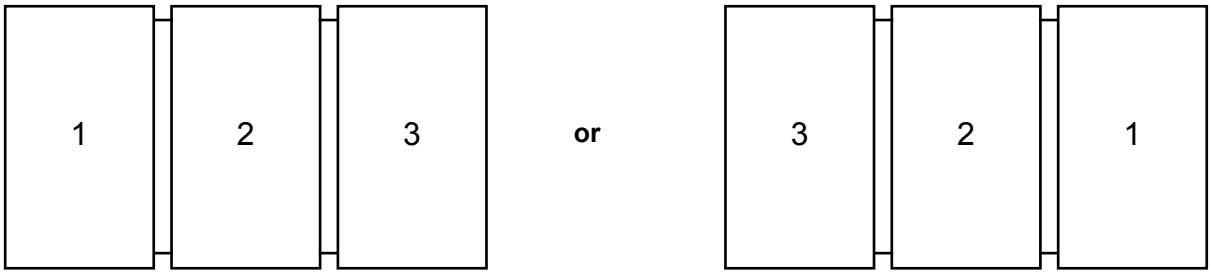
Single-row collector field

In case of single-row collector fields the collectors are installed starting with the respective outer collector.
The precise installation of the collectors is described from page 26.



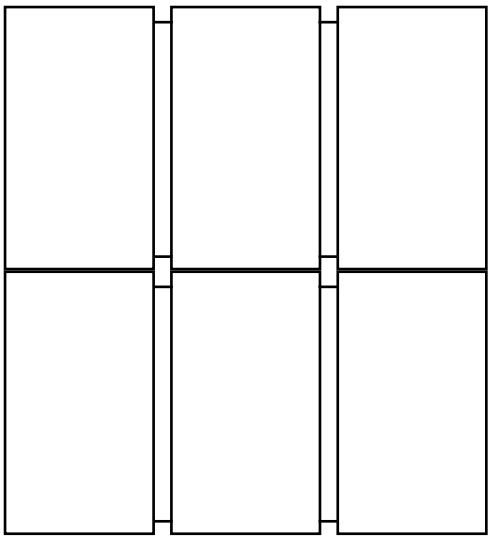
single-row collector field

Assembly sequence

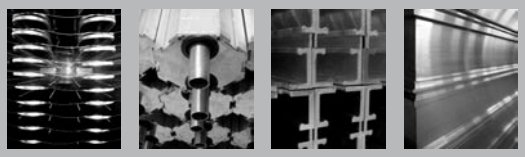


Multi-row collector field

In case of multi-row collector fields the superimposed collectors are installed first of all. After placing the first collector, the second one is to be adjusted above the first one. The bordering collectors must be precisely aligned.
The precise installation of the collectors is described from page 26.



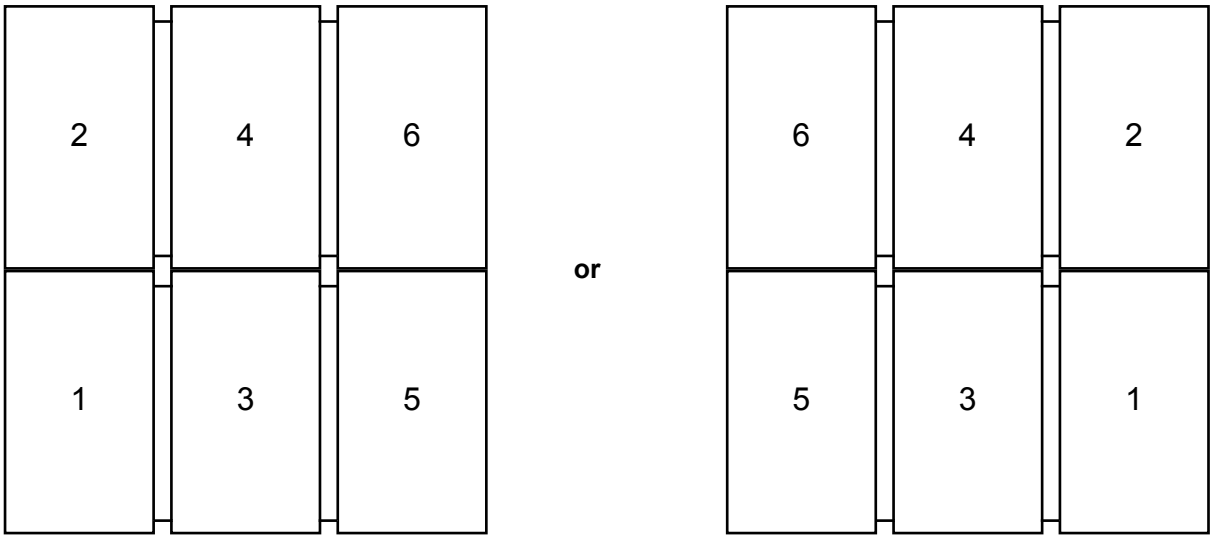
multi-row collector field

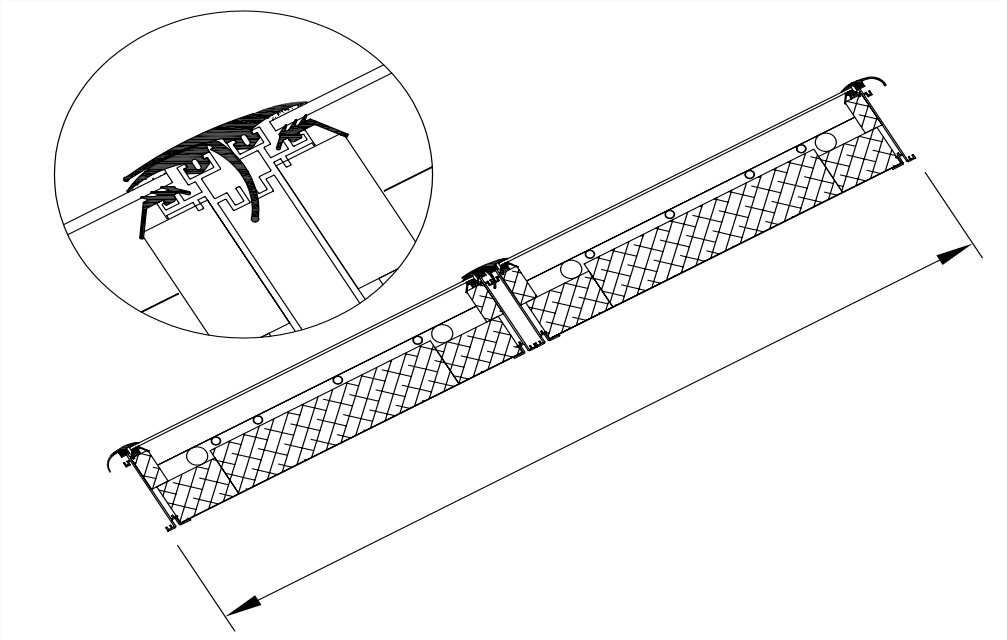


SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

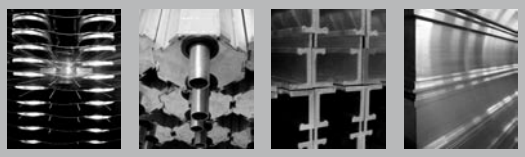
Assembly collectors

Assembly sequence





In case of multi-row installations the collectors are 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 so that an optimum waterflow is guaranteed.



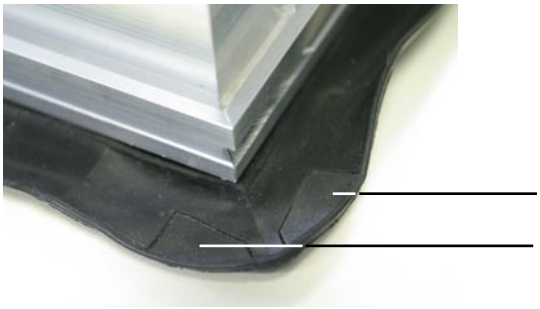
SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly collectors

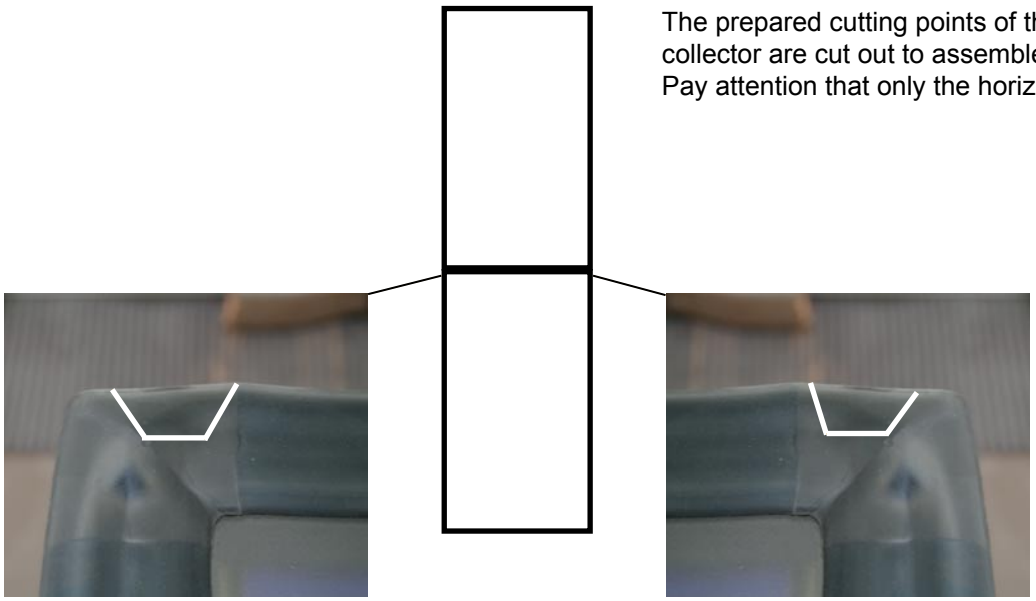
Multi-row collector fields with distance metal sheets

It is possible to assemble metal sheets between the collectors to achieve a homogeneous appearance of the installation. The distance metal sheets are assembled exclusively for optical aspects and do not have any influence on the installation. Therefore the distance metal sheets can be ordered optionally and are not necessarily included in delivery.

In multi-row installations the collectors are mounted adjoining. The lip (collector covering) must be cut out in the appropriate places to install the distance metal sheets easily .

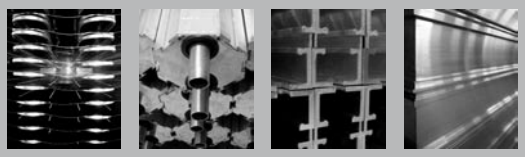


prepared cutting points in all corners of
the underside of the lip (collector covering)



The prepared cutting points of the EPDM-covering of each lower collector are cut out to assemble the distance metal sheets correctly. Pay attention that only the horizontal cutting points are cut out.

With a knife cut off carefully the prepared cutting points on the lip (collector covering).



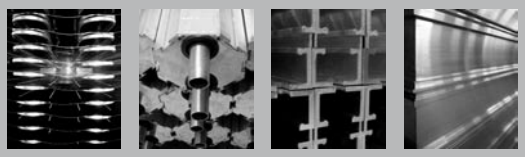
SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly collectors

By removing the lip (collector covering) on the appropriate place the distance metal sheets can easily be mounted.

When mounting the upper collector, pay attention that the lip (collector covering) of the lower collector is covered by the upper collector (see figure page 23).

The assembly of the collectors is illustrated on the following pages. The assembly of the distance metal sheets is described in detail on page 32.

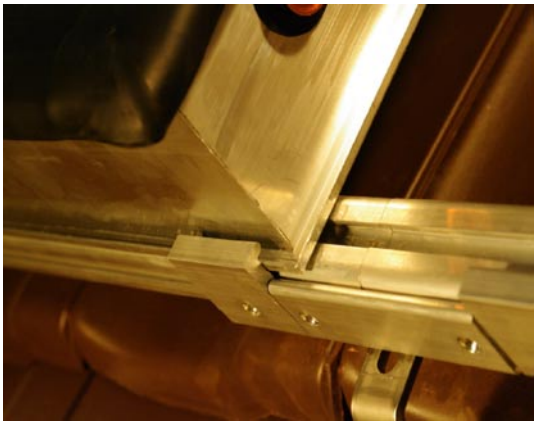


SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly collectors

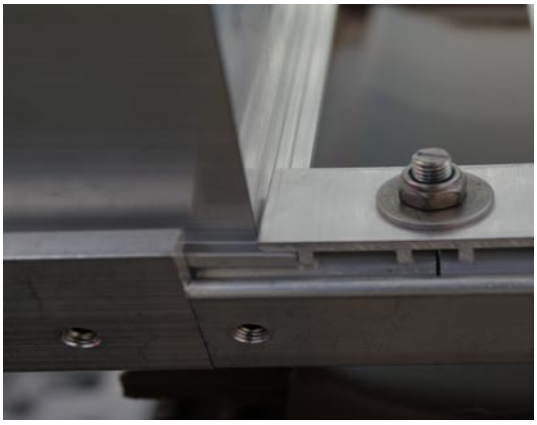
Placement of the first collector.
Place the collector on the upper profile rail and put it down on the lower one.

Make sure that the back panel of the collector is not damaged by any protruding parts.



The collector is applied to the profile of the collector stop set.

The stop set profile has to be mounted so that it can be fixed indented maximal 20 cm from the outer edge of the collector.



The previously inserted collector fastening plate “double“ is introduced to the stop position on the collector. Then the T-head screw is fixed lightly with the washer and the nut M8.

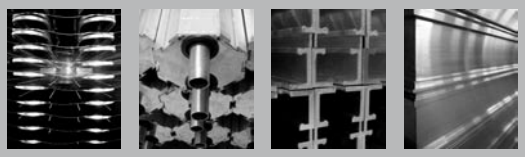
To guarantee the mounting measure the T-head screw of the fastening plate has to be located on the joining point of the fastening profiles.

1400021 Collector fastening set profile FKA

The fastening plate “single“ is inserted and fixed on the outside of the collector.

Tighten the fasteners after having mounted the hydraulic collector connections (see page 27).

1400020 Collector fastening set profile edge FKA



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly collectors

Before mounting the following collectors, the compensator has to be installed on the flush protruding copper flange.

It is important to ensure that the o-ring seal is used for the compensator.

1300001 Collector connection set hydraulical

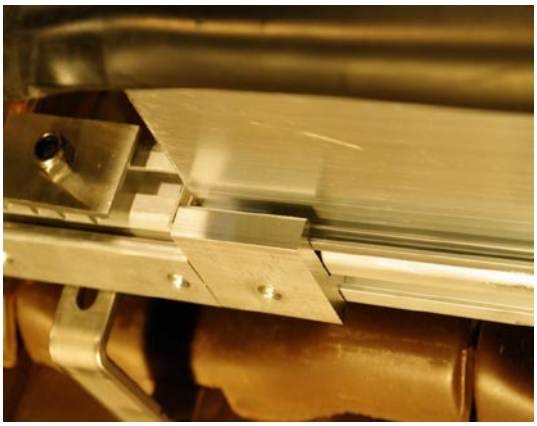
Fixation of the compensator on one side with the clamp.

Before tightening of the screw the clamp must be positioned by a rotary motion up and down. Tighten the screw on the clamp only manually. The use of cordless drill or similar may cause damages on the thread of the clamp. Tighten the clamp until the two lugs superimpose in the whole length.

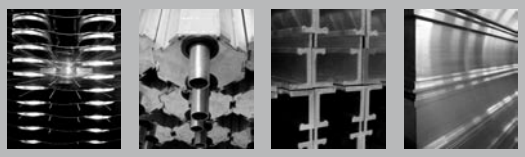
1910001 Tool set

Completely installed compensator with O-ring seal.
Fastening plate double slightly fixed.

Prepare assembly of the next collector on the upper and the lower side of the collector as shown in the picture.

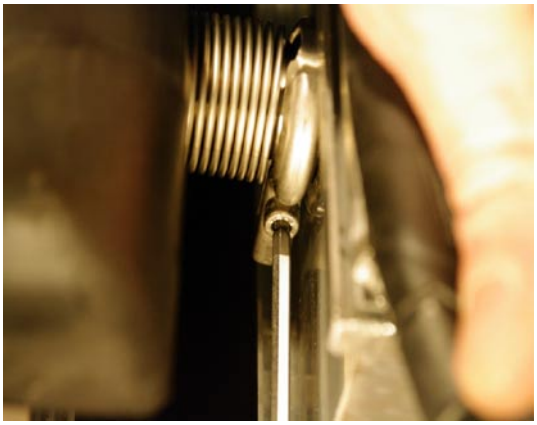


Put the collector on the fastening profile and push it carefully to the already assembled collector. Pay attention that the compensators are properly inserted.



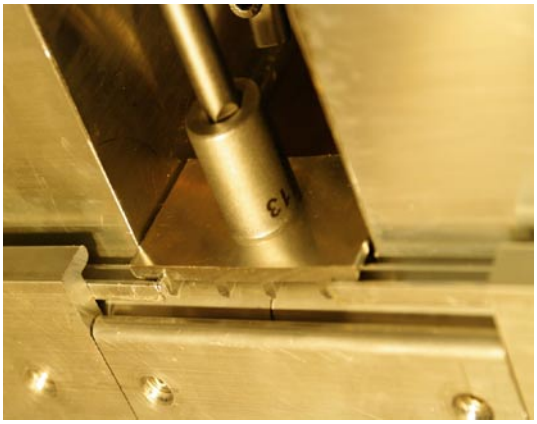
SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Assembly collectors

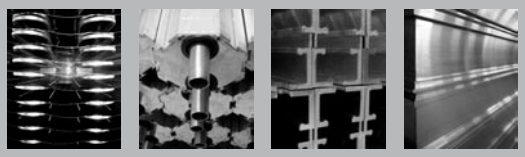


Tighten the clamp on the compensator. Pay attention to the correct position of the clamp and the o-ring seals.

Install the fastening plates single on the edge and tighten them.
Do not exceed the tightening torque of 37 Nm.



Tighten the fastening plate double.
Do not exceed the tightening torque of 37 Nm.



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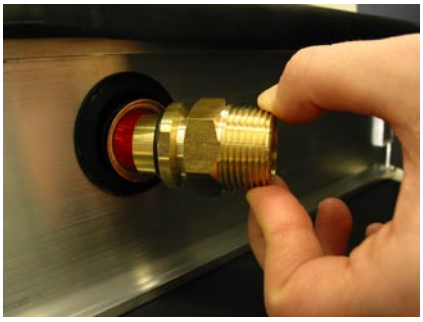
Arrangement hydraulic connections

Cap

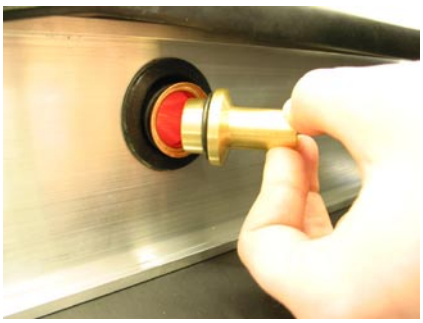
is mounted on all non-used collector connections.

1310009 Cap set



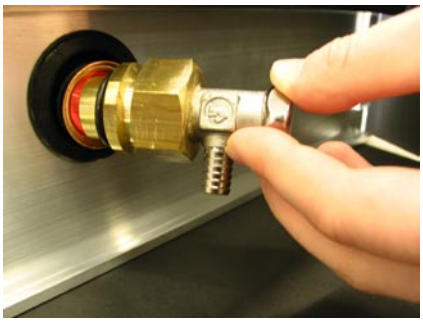
Connection 3/4“

1310005 Collector connection set R3/4“ (2 pcs. compl.)



Connection for reductions

1310001 Collector connection set 12 mm (2 pcs. compl.)
1310002 Collector connection set15 mm (2 pcs. compl.)
1310003 Collector connection set18 mm (2 pcs. compl.)
1310004 Collector connection set 22 mm (2 pcs. compl.)



Air eliminator without extension

1310007 Air eliminator set without extension pipe (compl. with caps)

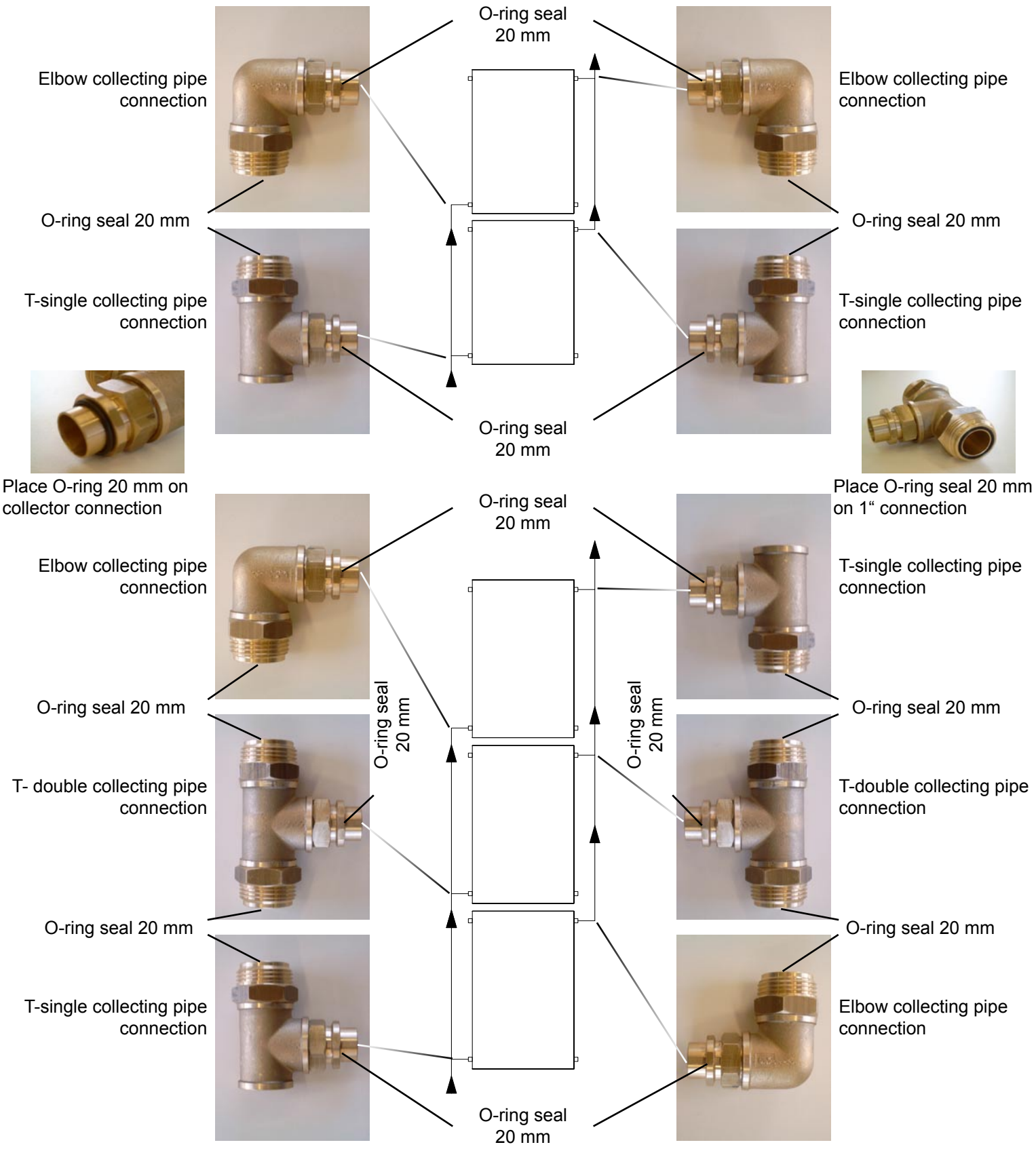
Completely mounted air eliminator

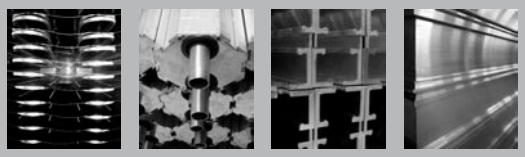
All other connections as well as the covers are mounted in the same way.

The required connection dimension must be calculated by the designer of the installation, depending on local conditions (line lengths, additional resistors etc.).

Hydraulic connection with manifold

Hydraulic connections for multi-row systems





SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Overview hydraulic connections / accessories

Hydraulic connections

Exhauster connection
For the installation at the collector without extension

Collector connection 3/4“
for thread fittings

Collector connection 22 mm
for soldered fittings or clamping ring joints

Collector connection 18 mm
for soldered fittings or clamping ring joints

Collector connection 15 mm
for soldered fittings or clamping ring joints

Collector connection 12 mm
for soldered fittings or clamping ring joints

Collector connection hydraulical (compensator)
connects two collectors and compensates thermal dilations.

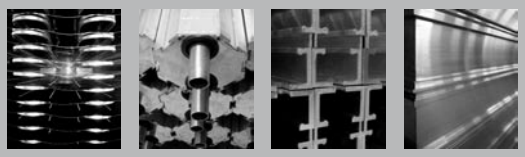
Clamp collector connection and O-ring seal
Clamp for connection of the above mentioned hydraulic devices with the flange at the collector

Accessories

Tool set

Spare set hydraulical

Assembling spare set



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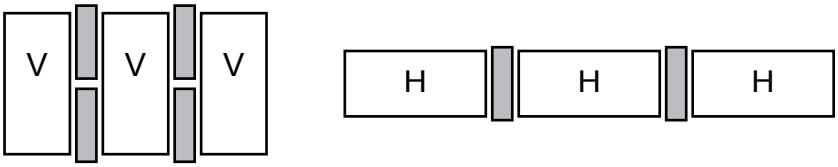
Assembly distance metal sheets

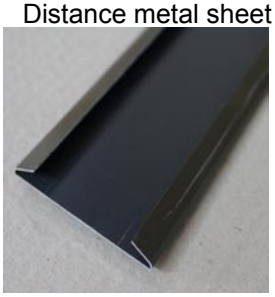
It is possible to mount metal sheets between the collectors for a homogenous appearance. The distance metal sheets are only assembled for optical aspects and do not have any functional influence on the system. Therefore, the distance metal sheets have to be ordered seperately and are not necessarily included in the delivery.

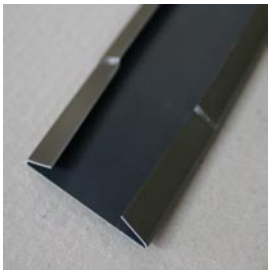
Distance metal sheets for the assembly in one row



For the collector types FKA 240 V and FKA 270 V in every gap between the collectors two distance metal sheets are mounted. For the collectors FKA 240 H and 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


top


bottom


1


2

Fig. 1
The distance metal sheet is inserted from below into the collector grooves.

Fig. 2 and 3
In case of vertical collectors or rather in case of multi-row assembly of the collectors further distance metal sheets are inserted subsequently from below. The lower distance metal sheet must be pushed over the upper one to the notches.
Afterwards, the distance metal sheets are pushed upwards.

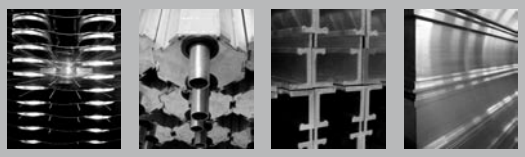

3


4

Fig. 4
The distance metal sheet is pushed so far until it is flush with the lip (collector covering). The distance metal sheet is sticked in the collector groove to protect it against slipping out.

1200039 Distance metal sheet FKA 240 V
1200040 Distance metal sheet FKA 270 V
1200042 Distance metal sheet FKA 240 H / 270 H

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



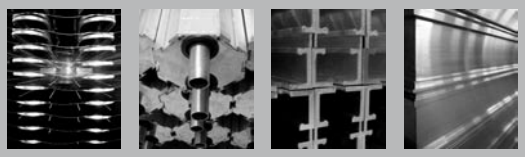
SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

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 x1	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

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

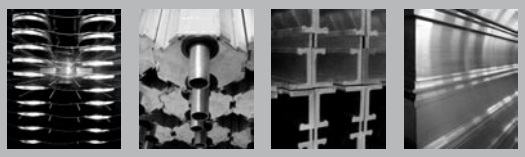


SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

Pipe dimensions of the connecting pipe

Recommended pipe dimensions 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



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 that may affect or prevent the funtion of the safety valve.

Carry out maintenance and inspectionw 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 never falls below 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):

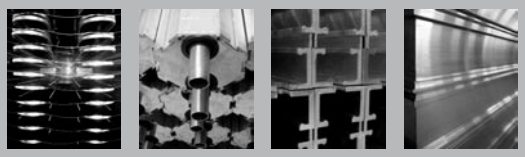
- solar collectors
- solar circle
- heat transfer fluid
- solar storage
- solar regulator incl. circulation pump
- supplementary heating system

Unscheduled maintenance

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

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



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

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	K	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

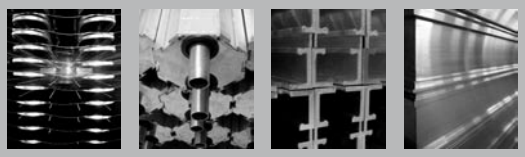
Visual check	normal/pink		brown		black	murky
Type			Minimum value	Actual value	System	rinsed
Liquid capacity		pH-value				filtered
Ratio		Frost protection				bleeded

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

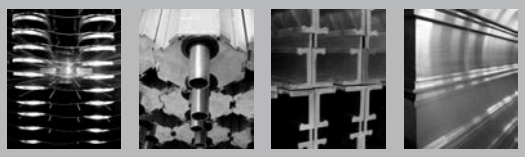
Remarks:



SOLAR TECHNOLOGIE INTERNATIONAL GMBH sti

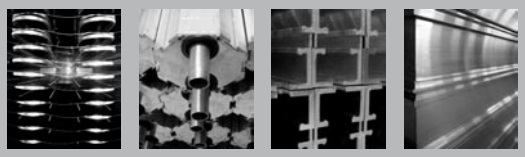
Initial operation

Schematic drawing of the system construction and piping scheme:



Initial operation

Notes



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 accessoiries

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 of influence and they are not explicitly known before execution.

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