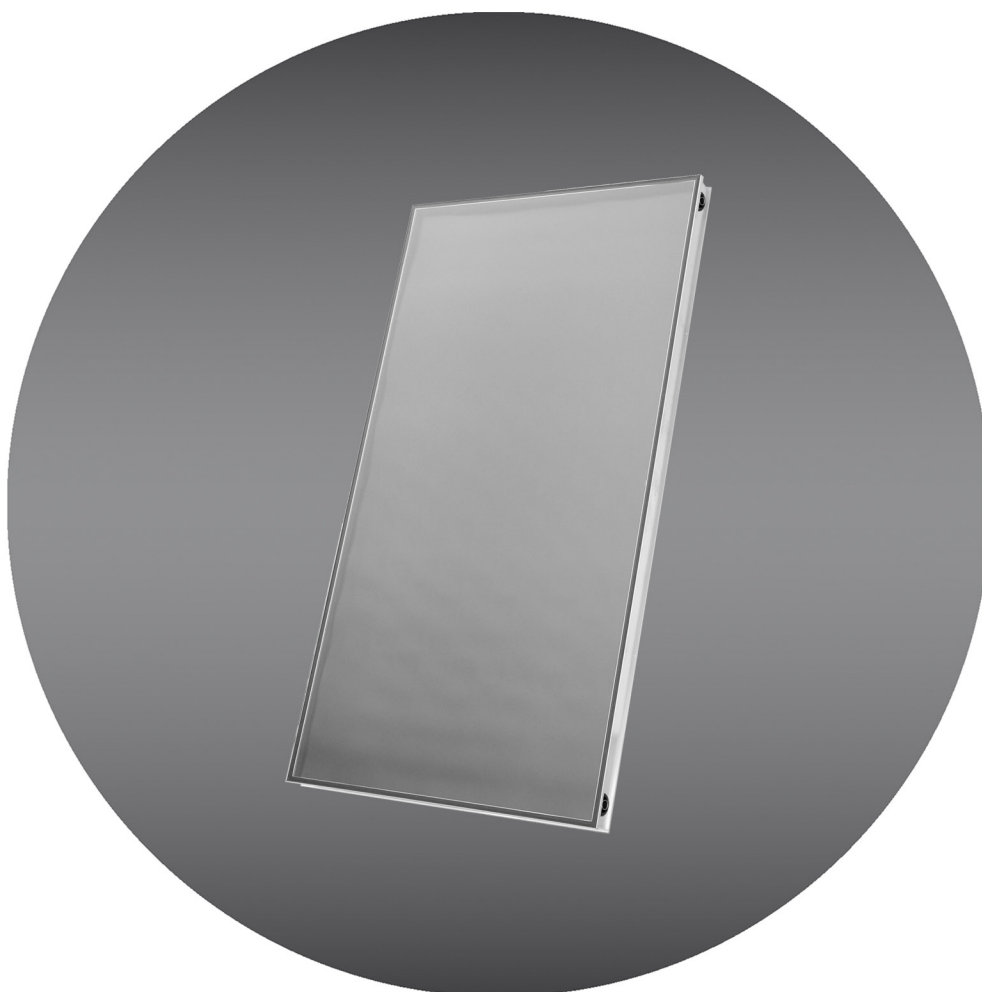


Installation

SolvisCala 254 EasyCon

Installation / Commissioning / Maintenance



1 Information About These Instructions

These instructions are intended for you as a technician from an installation company. You will find the specifications for installation, start-up and maintenance of the system here.

Please keep these instructions with the system so they can be referred to when necessary.

As we are interested in improving our technical documentation, we appreciate feedback of any kind.

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A list of our international representatives is provided at www.solvis.com.

Please understand that the telephone numbers are reserved for use by our installers.

Interested system operators should contact their installer.

Symbols used



DANGER

Immediate danger, with serious health consequences and even death.



WARNING

Danger, with potentially serious health consequences.



CAUTION

Possible risk of moderate or light injury.



CAUTION

Risk of damage to unit or system.



Useful information, notes and work tips.



Change of document, referring to another document.



Energy-saving tip with suggestions on how to save energy. This reduces costs and helps protect the environment.

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2 Notes

2.1 Safety Notes



DANGER

Observe the safety notes

This is primarily for your own safety.

- Make sure that you are familiar with the safety notes before beginning work.
- Observe and adhere to the applicable safety regulations and accident prevention regulations.



CAUTION

Country-specific regulations

Regulations can differ depending on the country and the region.

- These are to be observed and adhered to in order to ensure safe and faultless operation.
- If certain laws and regulations do not apply in a particular country, they are to be replaced by the country's own specific laws and regulations.

2.1.1 General Information



DANGER

Note the following in the vicinity of live overhead electric cables:

Touching the overhead cables or a flashover may cause burns or cardiac arrest.

- When working in the vicinity of overhead electric cables, observe the safety clearances.
- Refer to the Employers' Liability Insurance Association (German: "Berufsgenossenschaft") guidelines for safety and health at work to find out the applicable safety clearances and further measures.



WARNUNG

Burn hazard when there is direct sunlight

Fluid that remains in the collector or steam released from the collector can cause scalding. Touching hot connections may cause burns.

- Perform work on the collectors only when the sun is not shining or when the collectors are covered.
- Remove the sun protection only after the (re-) commissioning of the solar plant.



CAUTION

Do not make any unauthorised modifications

Otherwise, there is no guarantee that the system will function correctly.

- You must not make any changes to the components of the unit.
- Only use original spare parts.



CAUTION

Lower side of the collector is hot

This may damage the components below the collector.

- Materials that come into contact with the rear side of the collector must be able to withstand temperatures up to 120 °C.
- Otherwise, they must be spatially and thermally separated from the rear side of the collector.



CAUTION

Observe instructions

Solvis is not liable for any damage resulting from non-observance of these instructions.

- Read the instructions carefully before operating or installing the system.
- Contact our Technical Sales department if you have any questions.



WARNING

Read before working on roof

Injury hazard

- Check the local conditions and construction requirements carefully before beginning the installation. Employ a structural engineer for advice if necessary.
- For roof-mounted installations, you must construct a collective non-personal fall prevention or fall arrest system in accordance with DIN 18338 (roofing and roof sealing work) and DIN 18451 (scaffolding work with safety nets).
- If, for technical reasons, a collective non-personal fall prevention system is not available, safety harnesses must be used.
- Use only tested and recommended safety harnesses: safety belts, lanyards or straps, shock absorbers, fall arresters. Attach safety harnesses only to load-bearing structures and/or fixing points.
- In addition to protecting those participating in the construction project, uninvolved third parties must also be protected from falling objects.
- The use of normal non-secured ladders can cause accidents if the ladder sinks in, slides or falls over. Do not use damaged ladders. Ensure that the ladder is at the correct angle; between 68 and 75°. Secure all ladders.
- Wear safety gloves, a helmet and safety boots during installation. Also wear protective goggles when drilling or grinding.
- Protect against moisture and dampness during electrical installation.



Work to be performed by qualified technicians

- Only trained specialist companies may install or maintain the system.
- Only qualified electricians may work on electrical equipment.



CAUTION

Observe all instructions regarding seals

- Flat seals can become brittle from prolonged exposure to heat. Replace the flat seals before filling if the collector has been installed long before start-up.
- The O-rings on the collector connectors should not be greased or oiled.

Intended use

The solar collectors are intended only for indirect heating of drinking water and for heating support and must be operated with appropriately sized heat exchangers between the closed solar circuit and heat consumer.

Operating these collectors for any other purpose is prohibited. Exceptions require express written approval or a statement from the manufacturer in advance.

The warranty is voided if:

- The components supplied are subject to improper use or modified without permission,
- The installation instructions are not properly observed during installation,
- The structural requirements regarding the snow and wind loads are not observed.

Disclaimer

The manufacturer accepts no liability for any damage that occurs as a result improper, incomplete or false information.

2.1.2 Regulations

This overview is for orientation purposes only and does not claim to be complete.

In addition, all recognized technical regulations apply.

Specifications, standards and guidelines must be applied as implemented in the country in question.

The following regulations and guidelines must be observed:

Legal requirements

- Legal regulations on accident prevention
- Legal regulations on environmental protection
- Trade association regulations
- Building regulations of the respective federal state
- GEG Building Energy Act

Standards and guidelines

- DIN, EN and VDE safety requirements.

Installation on roofs

- DGUV regulation 201-054: Roofing, carpentry and wood-work
- DIN 18338 Roofing and sealing work
- DIN 18339 Plumbing work
- DIN 18451 Scaffolding work

- DIN EN 1995 Design and construction of timber structures
- DIN EN 1991 Effects on load-bearing structures.

Connection of solar thermal systems

- EN 12975 Solar thermal systems and their components, collectors
- EN 12976 Solar thermal systems and their components, prefabricated systems
- EN 12977 Solar thermal systems and their components, customized systems
- EN ISO 9488 Solar thermal systems and their components, terminology
- VDI 6002 Solar domestic hot water heating
- DIN EN ISO 17672 Brazing - Solders.

AVB Water, DVGW worksheet

- W551, W552 Technical measures to prevent the growth of legionella.

Installation and equipment of water heaters

- DIN 18380 Heating and domestic hot water systems - Leak test
- DIN 18381 Gas, water and waste water installation work
- DIN 18421 Insulation work on technical installations
- DIN 1988 Technical rules for drinking water installations
- EN 1717 Protection of drinking water against contamination in drinking water installations
- DIN 4753/EN 12897 Water heaters and water heating systems for drinking and process water; requirements, marking, equipment and testing.

Electrical connection

- VDE 0100 Installation of electrical equipment, earthing, protective conductors, equipotential bonding conductors
- DIN EN 62305 Lightning protection of buildings - Part 1: General principles
- VDE 0100-540 Main equipotential bonding of electrical installations.

2.1.3 Declaration of conformity

We hereby declare that SolvisCala 254 EasyCon complies with the basic directives for placing on the market in the EU.

2.1.4 Duties of the craftsman

To ensure that the system functions properly, observe the following:

- Carry out all activities in accordance with the applicable standards and regulations
- Instruct the operator in the function and operation of the system
- Inform the operator about the maintenance of the system
- Inform the operator of possible hazards that may arise when operating the system.

2.2 Preventing Damage

2.2.1 Roof Construction



CAUTION

Failure to observe will void all warranty claims.

- You must ensure that the roof sub-structure is in perfect condition (structural analysis).
- Specifications for load-bearing structures assume that snow can slide off of the roof unhindered (no snow guards, dormer windows or similar fixtures underneath the collectors).
- If the distance above the solar system to the roof ridge is longer than 3 m and the roof slope is greater than 30°, we recommend placing snow guards above the solar system.
- The roof surface cannot have any height differential greater than 0.3 m, and it must not be shaped in any way that would allow snow to pile up.
- Possible solutions are to be implemented on-site.

Selection and dimensioning of the appropriate mounting material must be based on a static calculation. The local conditions (wind and snow load, building height, height above sea level, installation angle, etc.) must be included.

2.2.2 Collector in general

Transporting the collectors

The collector connections must not be subjected to load. Always use the Solvis collector installation grip to transport the collectors properly. Observe the instruction sheet for the installation grip.

Collector storage

If stored temporarily after delivery, the collector must be protected from moisture and frost. Either store it in a sheltered space or outside at a minimum slope of 15°.



CAUTION

The SolvisCala must not be stored horizontally outdoors

Moisture can otherwise penetrate the collector and cause damage

- Storage angle: > 15°.

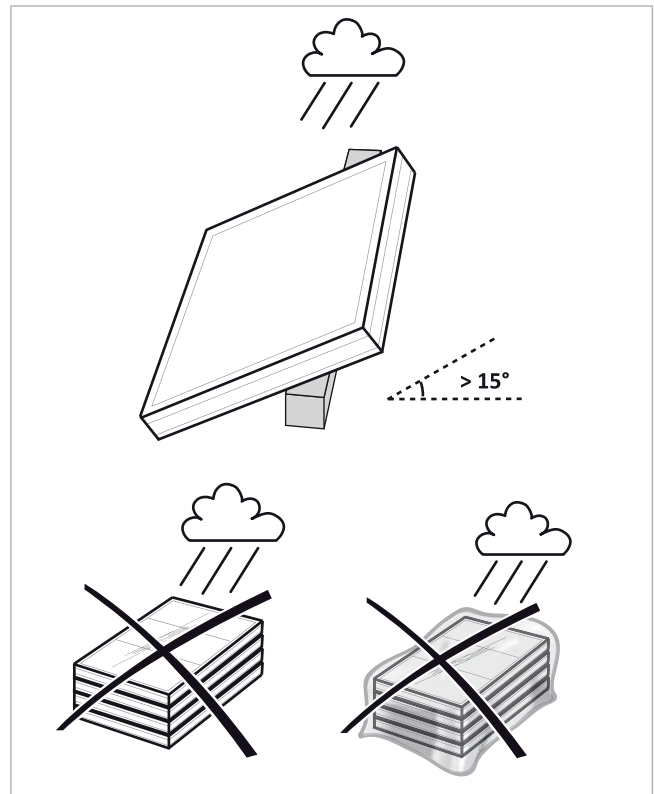


Fig. 1: Storing the SolvisCala outdoors



CAUTION

Risk of corrosion

- Do not install the solar system on copper roofs or underneath copper components.



CAUTION

Risk of deposits

- Once the collector has been previously filled with solar liquid, it may not be exposed to sunlight when empty.



CAUTION

When filling the solar circuit:

- Fill only with original Tyfocor LS-rot ready-mixed heat transfer fluid and flush.
- Using other types of heat transfer fluid in this system is prohibited because it may damage the solar circuit components.
- Use only the Füll-Jet unit to flush and fill the system (please order separately).

2.2.3 Solar glass pane



CAUTION

Damage to the surface possible

- Leave minor soiling untreated. You have no influence on the effectiveness of the collector. Otherwise the pollutant may be ground into the surface or damage the surface coating.

Notes on handling

- Avoid leaving fingerprints. Handle the sheets only with clean, soft (cotton) gloves (no leather gloves)
- Do not expose the glass panes to uneven pressure
- Avoid soiling: keep all surfaces and objects that come into contact with the panes clean (e.g. storage surfaces, glass lifters, tools)
- Avoid contact with substances such as silicone, oil and other lubricants as well as other mineral substances such as cement and mortar
- Avoid letting rain from façades (especially with mineral coatings) run off onto the collector

Notes on cleaning

- Only clean windows gently with a microfiber cloth and without pressing on them
- Use only glass cleaner or isopropyl alcohol for cleaning
- Do not use aggressive, scouring or chemical cleaning substances
- No mechanical cleaning: do not use abrasive sponges, steel wool, or scrapers

2.3 Overvoltage Protection

Lightning protection

Clarify if a lightning arrester is required according to building legislation. In addition, the planner or insurance company may require that lightning protection be installed. Take this into account accordingly.



CAUTION

Observe the following for lightning protection devices

- The layout and installation of lightning protection devices should be carried out by suitably qualified technicians only, in accordance with the recognised technical regulations.
- Observe the general principles of the DIN EN 62305 lightning protection standard.

External lightning protection

External lightning protection comprises interception devices, conductors and ground electrodes.

If a lightning protection system is in place, the planner checks if and how (separation distance) the planned solar system can be positioned within the interception devices. This applies in particular:

- If an external lightning protection system is required
- If additional lightning protection is required for solar systems which are elevated in an exposed location on public buildings (e.g. if the building becomes significantly taller as a result).

Internal lightning protection

The internal lightning protection comprises equipotential bonding and overvoltage protection for electrical devices. There must always be a connection between the equipotential bonding of the house and the solar circuit piping (solar flow and solar return); the cross section of the connection must be a minimum of 6 mm².



Even if no lightning protection is needed, you should at least install a lightning protection box (as close to the sensor as possible) to protect the collector sensor against overvoltage.



CAUTION

Please note the following with regard to lightning protection

Note that even a lightning protection system that fulfils all standards cannot guarantee complete protection against damage caused by lightning.

2.4 Dimensions

The collector spacing must be observed when connecting the collector connectors. Measurements are performed on the base (foot) of the collector.

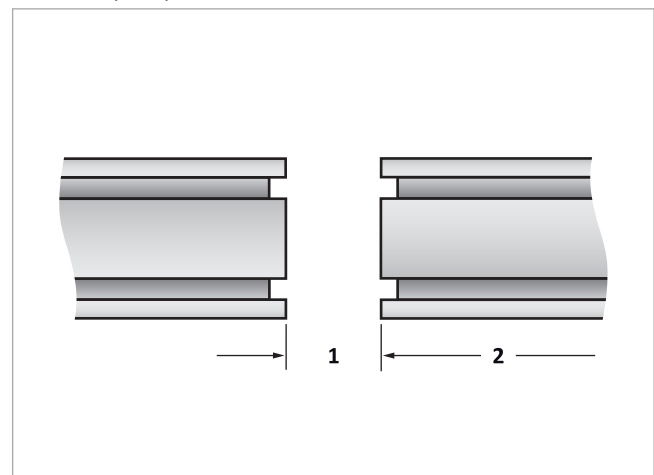


Fig. 2: The horizontal and vertical mounting clearance for collectors is measured at the base (foot) of the collector.

- 1 Clearance (horizontal and vertical at the bottom)
- 2 Head and foot dimensions (length and width top/bottom)

Collector dimensions and clearances

Designation	C-254-EC
Length (Head measurement)	2168
Width (Head measurement)	1168
Horizontal clearance	30
Vertical clearance (vertical mounting)	180

All dimensions in [mm]

2.5 Orientation



CAUTION

Avoid excessively high temperature loads.

Otherwise, there may be damage to the solar system.

- The lower edge of the collector field **must not** be below the upper edge of the SolvisMax!

A solar system generates a maximum yield when it is facing due south. The recommended slope angle α of the collector in relation to horizontal depends on the type of installation, and is between:

- **Roof-mounted** 20° to 60°
- **Flat-roof** 30° to 60°
- **Wall** 45° to 90°. With additional cover on-site when 60° or more. Only 3 m above ground level when 75° or more.



CAUTION

avoid slope angles smaller than 20° vermeiden

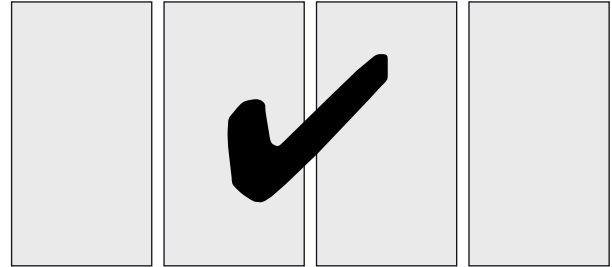
Otherwise losses in the solar yield or damage caused by condensation in the collector are possible.

- Slope angles should always be greater than 20°.
- For small slope angles (20° to 30°), an increased amount of condensate in the collector must be expected

Mounting orientation

Due to its internal piping, the SolvisCala EasyCon collector may only be installed in an upright position.

(A)



(B)

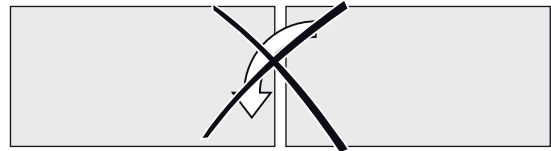


Fig. 3: Permissible SolvisCala EasyCon orientation

A Mounting orientation upright: i. O.

B Mounting orientation transverse: not OK.

2.6 Roof-Mounted, Flat-Roof and Wall-Mounted Installation

2.6.1 Installing the Holding Rails

Collectors are mounted on holding rails for roof-mounted, flat-roof, or wall-mounted installation. There are different combinations of pairs of holding rails available depending on the number of collectors connected in succession (see figure). They are screwed together on-site and mounted to the roof-mount frames or flat roof holders.

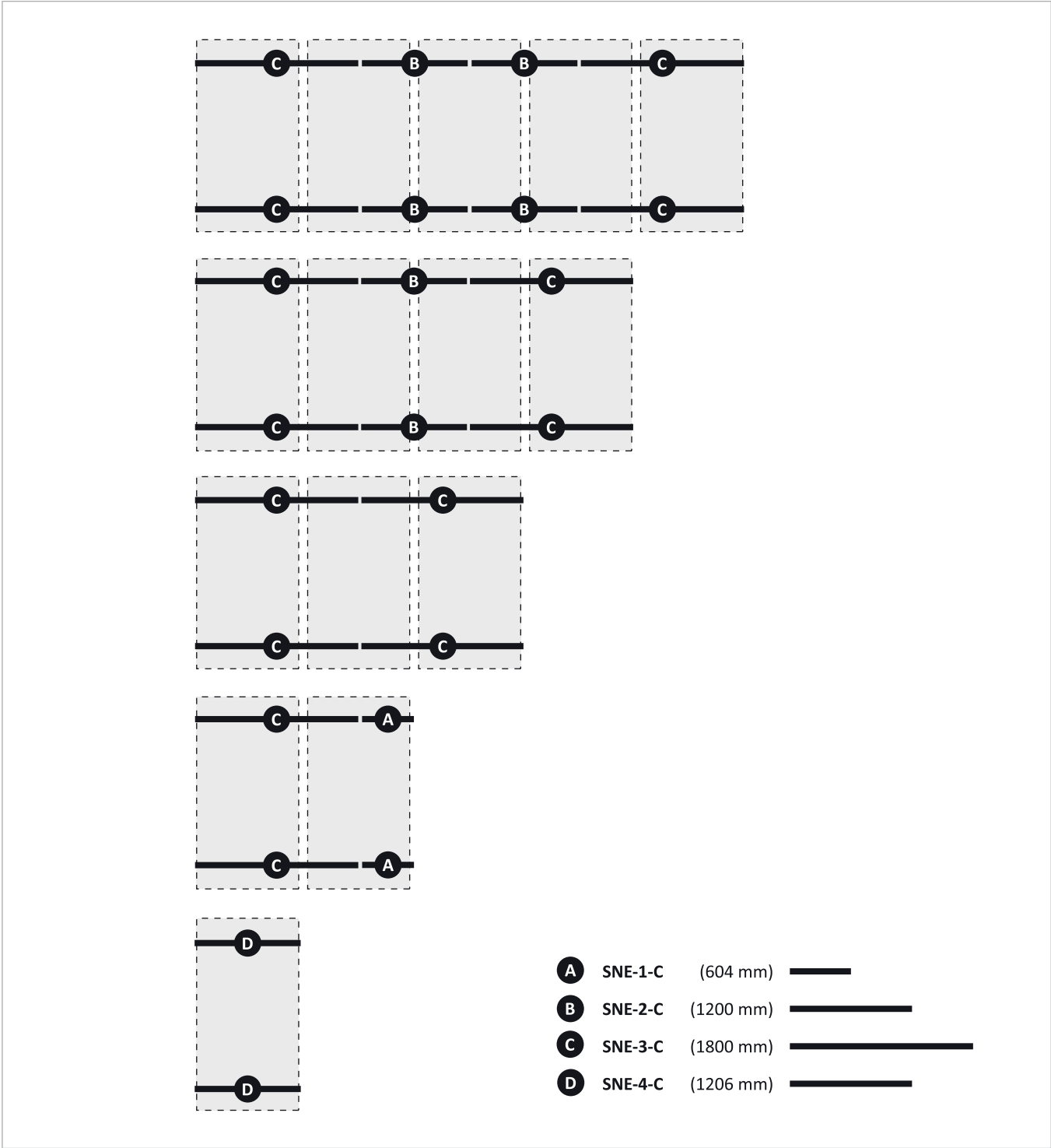


Fig. 4: Combination of pairs of holding rails

Holding rail assembly

Assemble the holding rails at ground level before mounting the collectors on the roof.

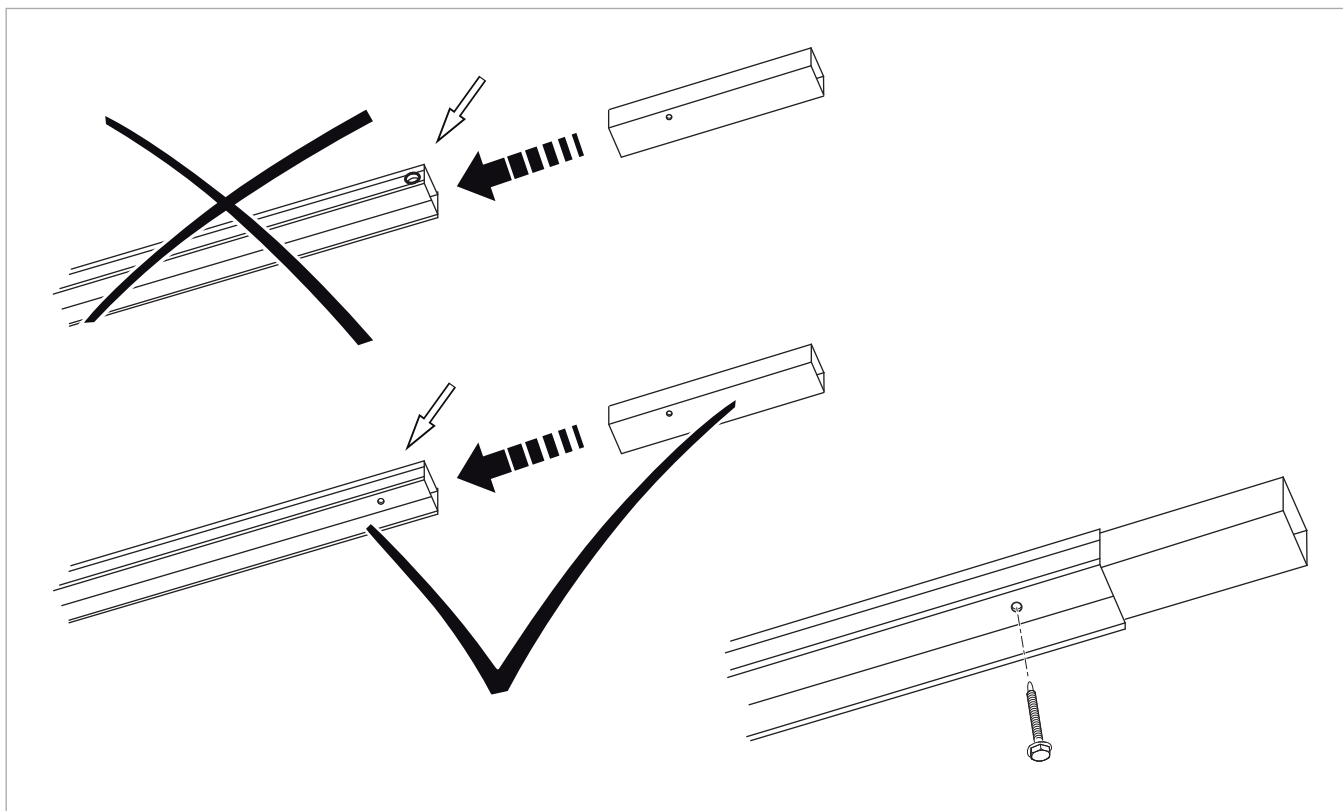


Fig. 5: Installing a connector

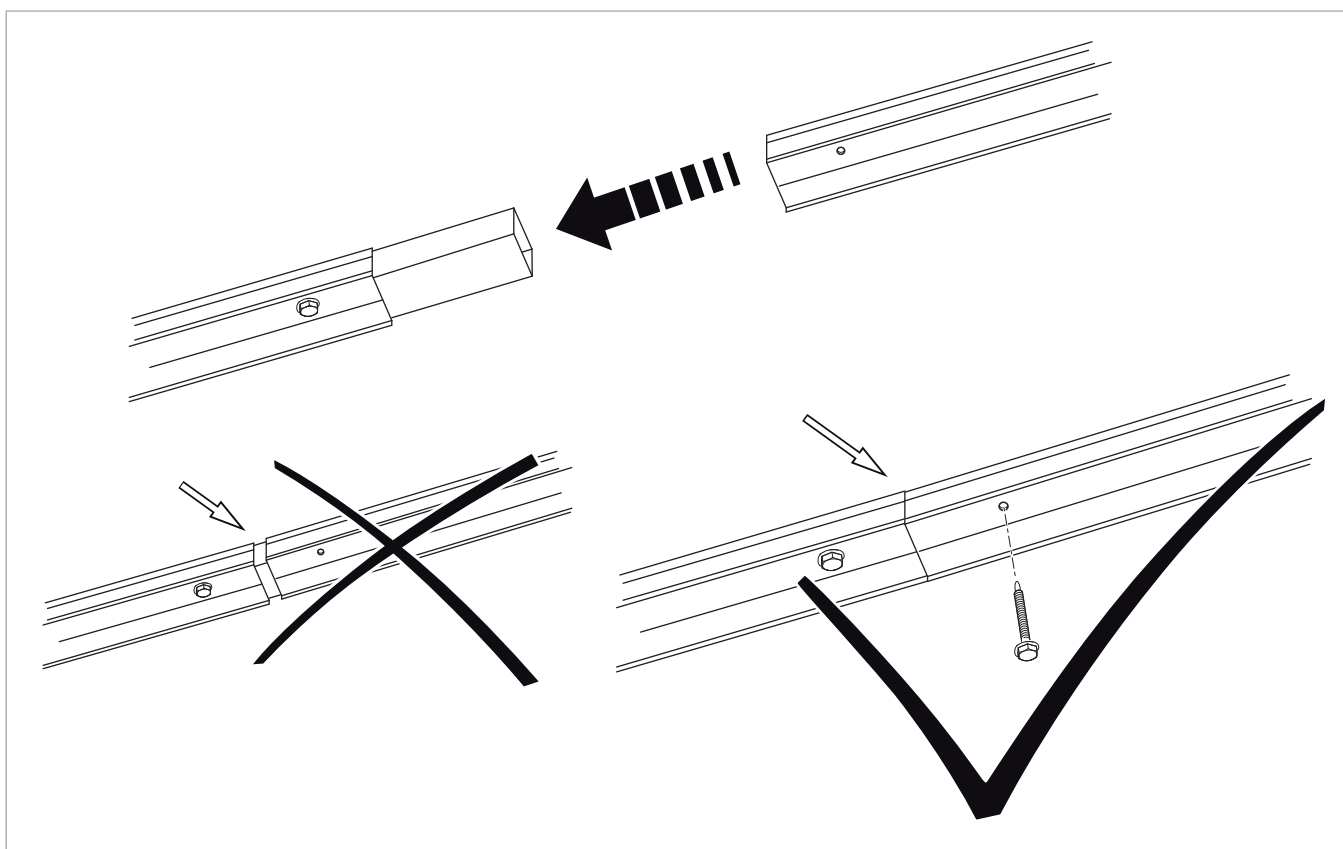


Fig. 6: Installing additional holding rails

2.6.2 Effects of Shadowing

Shadowing

Any shadow on the collector surface area reduces the solar yield and should be avoided whenever possible.

Shadows may also be cast by tall buildings, chimneys, dormer windows, tall trees, etc.

With flat-roof installation, it is also important to maintain sufficient spacing to prevent the adjacent collectors from casting shadows on one another.

Using the figures and the tables, you can calculate the spacing between the flat roof holders when taking shadowing into account:

- You can find the latitude of your location using → Fig. 7.
- The table shows the correct spacing given the latitude and the slope angle.

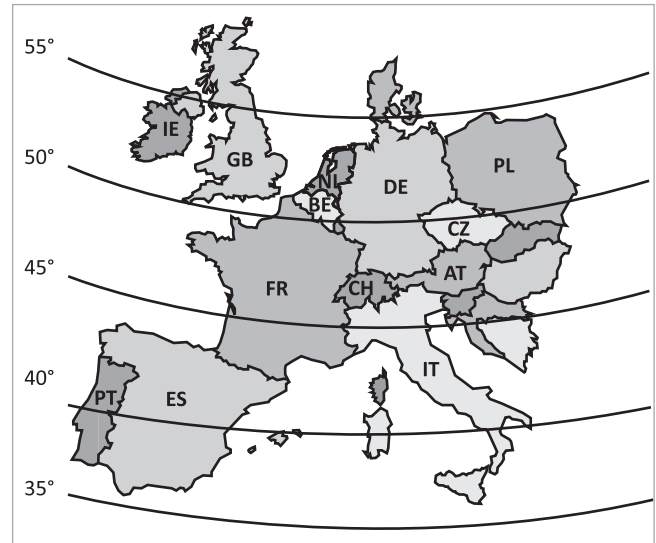


Fig. 7: Latitudes in Europe

Spacing depending on latitude

Latitude	Flat roof mounted Installation						Wall-mounted Installation			
	Spacing In [m] for the slope angle						Spacing In [m] for the slope angle			
	30°		45°		60°		45°		60°	
	Measure- ment a	Measure- ment b	Measure- ment a	Measure- ment b	Measure- ment a	Measure- ment b	Measure- ment c	Measure- ment d	Measure- ment c	Measure- ment d
55	5.34	9.12	7.56	10.64	9.25	11.43	2.51	5.59	1.77	5.53
54	4.90	8.68	6.93	10.01	8.49	10.67	2.61	5.69	1.85	5.61
52	4.20	7.98	5.94	9.02	7.28	9.46	2.83	5.91	2.00	5.76
50	3.67	7.45	5.19	8.27	6.36	8.54	3.08	6.16	2.18	5.94
48	3.25	7.03	4.58	7.64	5.63	7.81	3.37	6.45	2.39	6.15
46	2.91	6.69	4.11	7.19	5.04	7.22	3.71	6.79	2.62	6.38
44	2.62	6.40	3.71	6.79	4.54	6.72	4.11	7.19	2.91	6.67
42	2.38	6.16	3.37	6.45	4.12	6.30	4.59	7.67	3.25	7.01
40	2.18	5.96	3.08	6.16	3.78	5.96	5.19	8.27	3.67	7.43
38	2.00	5.78	2.83	5.91	3.47	5.65	5.94	9.02	4.20	7.96
36	1.84	5.62	2.61	5.69	3.20	5.38	6.93	10.01	4.90	8.66

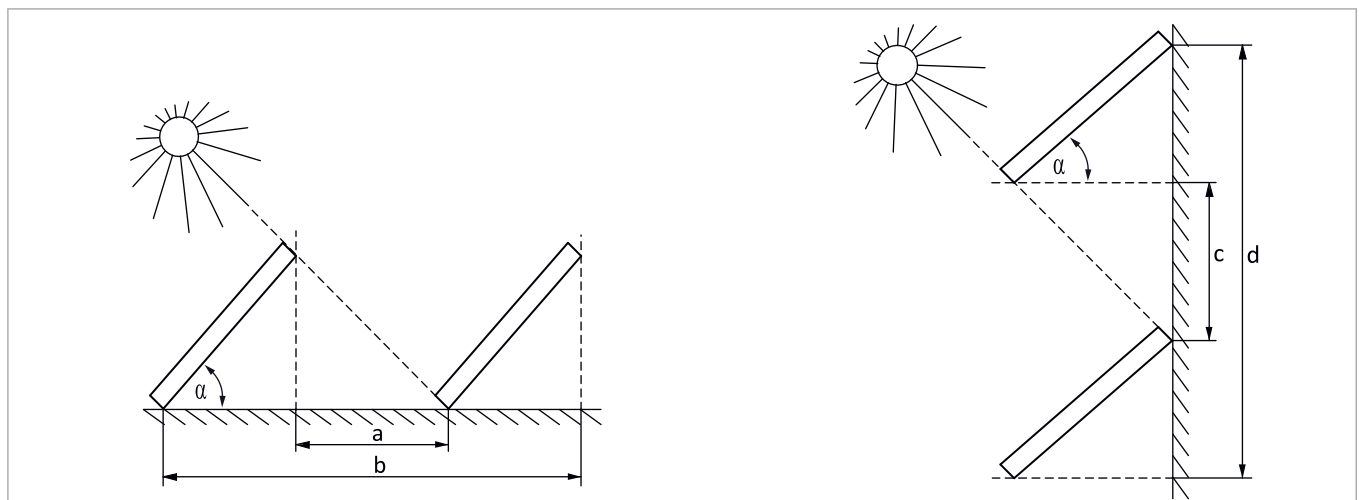


Fig. 8: Spacing and angles determined by shadowing

3 Hydraulics

Connection versions

Thanks to its hydraulics (distribution meander), the SolvisCala 254 EasyCon not only has low pressure losses, but also extremely favorable drainage behavior in the event of stagnation.

Collectors installed in a row are automatically connected in parallel with the distribution meander, whereby rows of up to 9 collectors are possible. The connection is preferably diagonal: bottom right - top left or bottom left - top right → Fig. 9 (A). The unused connections are sealed with dummy plugs.

With a maximum of 6 collectors, a one-sided connection is possible → Fig. 9 (B).

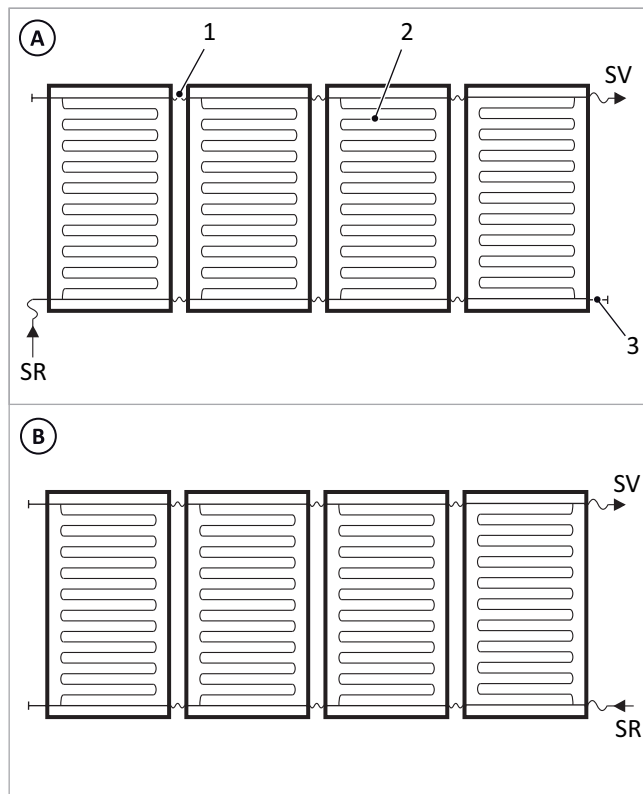


Fig. 9: Alternating connection for 1-9 collectors (A), single-sided connection for collector arrays of up to 6 collectors (B)

- 1 Collector connector
- 2 Collector
- 3 Blanking plug
- SR Solar return
- SV Solar flow

Important for trouble-free operation:

- Only install SolvisCala 254 EasyCon collectors upright (vertically)!
- Observe the orientation of the first and last collector in a row! The long side marked with a note must always face outwards (see → Fig. 9 (A) and Fig. 10). To do this, turn the collector by 180° if necessary. For collectors mounted within a row, the orientation is optional.
- The flow must always be from bottom to top!

Diese Seite muss bei Kollektorreihen nach außen zeigen!
This side must face outwards for collector rows!



Fig. 10: Note on the long side of the collector facing outwards

If this is not observed, sections of the collector pipe will not be flown through, which will lead to a deterioration in heat transfer and possibly to premature ageing of the solar fluid.

Pressure loss

Under the following conditions:

- Solar fluid ready-mix Tyfocor LS-rot
- Average collector temperature 40 °C

Number of collectors	60 l/h per collector		75 l/h per collector	
	Total volume flow [l/h]	Pressure loss collector field [mbar]	Total volume flow [l/h]	Pressure loss collector field [mbar]
2	120	93	152	103
3	180	96	228	107
4	240	101	304	116
5	300	110	380	129
6	360	123	456	149
7	420	140	532	175
8	480	161	608	208
9	540	188	684	249

Systems consisting of several rows

Several rows of collectors of the same size can be connected in parallel. In this case, only **one** flow connection needs to be equipped with a temperature sensor.

4 Roof-Mounted Installation

4.1 Scope of Delivery

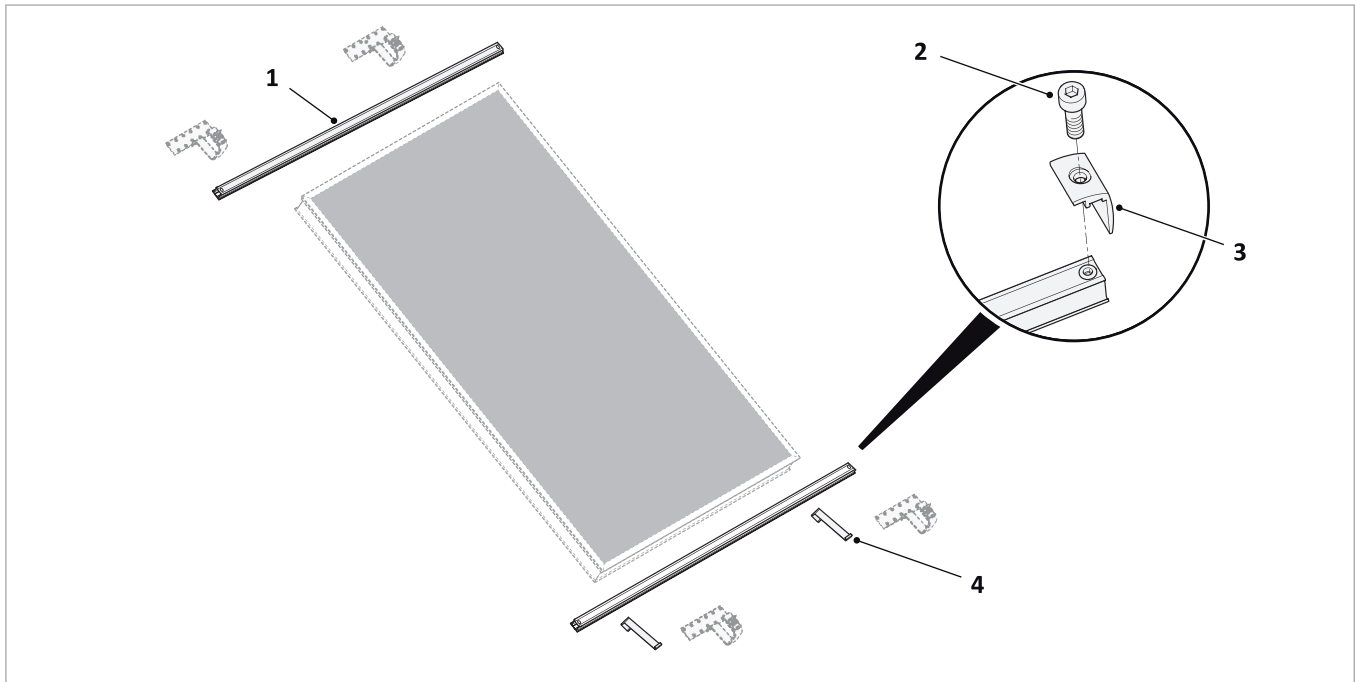


Fig. 11: Roof-mounted rail set (collector and roof-mount frame are not included in the scope of delivery)

- | | | | |
|---|-------------------------|---|------------|
| 1 | Holding rail | 3 | Edge clamp |
| 2 | Allen screw, M8 x 15 A2 | 4 | Stop hook |

List of tools

- Allen key size 6, extended by at least 10 cm
- Ratchet with extension, 17 mm socket
- Wrenches: size 12, 13, 14, 15, 17 (2 x), 19, 21, 27
- Bit: Torx 45
- Torque wrench
- Adjustable wrench, pipe wrench
- Pencil, felt tip pen or chalk
- Folding metre ruler, 10 m measuring tape
- Measuring cord, spirit level
- Rubber mallet, hammer
- Cable drum, protective goggles
- Cordless screwdriver and/or drill

4.2 Structural Requirements

4.2.1 Edge and Corner Areas

Increased static loads occur at the edge area of the roof.



CAUTION

Risk of overloading the brackets

- Due to increased static load, the solar system must not protrude out to the edge areas of the roof unless special measures are taken (DIN EN 1991).
- If the solar system extends into the edge area, suitable measures for stabilising the system should be taken on-site.

The side edge area (**e**) applies for installation without elevation with a slope greater than 20°.

For roofs with a slope less than 30°, maintain a lower and upper edge area as well (**e'**).

Side edge area (**e**):

$$e = b * 0,1$$

$$e = h * 0,2$$

Lower/upper edge area (**e'**), if necessary:

$$e' = l * 0,1$$

$$e' = h * 0,2$$

When calculating the edge areas, the **smaller value** is to be used as the minimum size of the edge area (**e** and possibly **e'**).

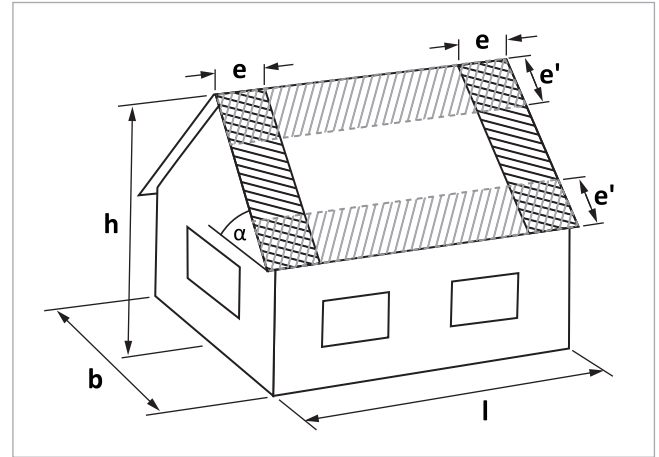


Fig. 12: Edge areas of the roof

- α Roof slope
- b Building width
- h Building height
- l Building length
- e Side edge area
- e' Lower/upper edge area

4.2.2 Structural Design

The following static designs only apply if all static requirements are met.



Contact our Technical Sales department if you have any questions.

Load class

Load classes were defined to simplify the design.

The snow and wind load zones must be identified before determining the load class, see → section "Snow and Wind Load Zones", p. 46.

SolvisCala roof-mounted installation / static design

The information in the table below applies to the following load cases:

- **up to and including wind load zone IV** (only applies to Germany)
- Installation height **up to 15 m** above ground level.
- The loads are calculated for a **30°** roof, which corresponds to the maximum load caused by snow.

Load classes are the result of different combinations of snow load zones and heights above sea level.



If the required ballast taken from the relevant table cannot be applied to the roof for structural reasons, an assessment of the individual circumstances is worthwhile. For this purpose, please send the completed statics project sheet for the installation of the collector (PRB-KOL, see → chapter "Statics project sheet for the installation of the collector" on page 48) to Solvis application consultancy; for phone numbers, see → chapter "Information About These Instructions" on page 2.

The Universal on-roof brackets are suitable for almost all roof tiles and concrete roof tiles. The structural design also corresponds to the corrugated roof, standing seam, plain tile and slate roof supports. A separate design is required for the large tile roof support set.

4 Roof-Mounted Installation

Snow load zone	Height above sea level	Load class	Requirement	Horizontally mounted SolvisCala collectors				
				1x C-254	2x C-254	3x C-254	4x C-254	5x C-254
1	Up to 400 m	A	Required number of pairs of roof-mount frames	2	3	4	5	6
1a	Up to 300 m							
2	Up to 200 m							
2a	Not permissible							
3	Not permissible							
1	Up to 500 m	B	Required number of pairs of roof-mount frames	2	3	5	6	7
1a	Up to 400 m							
2	Up to 300 m							
2a	Up to 300 m							
3	Up to 200 m							
1	Up to 800 m	C	Required number of pairs of roof-mount frames	2	4	6	8	10
1a	Up to 700 m							
2	Up to 500 m							
2a	Up to 400 m							
3	Up to 300 m							
1	Up to 950 m	D	Required number of pairs of roof-mount frames	3	5	7	9	11
1a	Up to 800 m							
2	Up to 600 m							
2a	Up to 500 m							
3	Up to 450 m							
1	Up to 1050 m	E	Required number of pairs of roof-mount frames	3	6	9	11	14
1a	Up to 950 m							
2	Up to 700 m							
2a	Up to 600 m							
3	Up to 550 m							

Maximum roof bracket spacings

Collector type	Designation	Maximum spacings $e_{\max}$ in [mm] for load class				
		A	B	C	D	E
1 x C-254	Number of roof brackets (pair)	2	2	2	3	3
	Roof bracket spacing	1168	1168	1168	584	584
2 x C254	Number of roof brackets (pair)	3	3	4	5	6
	Roof bracket spacing	1183	1183	789	592	473
3 x C-254	Number of roof brackets (pair)	4	5	6	7	9
	Roof bracket spacing	1188	891	713	594	446
4 x C-254	Number of roof brackets (pair)	5	6	8	9	11
	Roof bracket spacing	1190	952	680	595	476
5 x C254	Number of roof brackets (pair)	6	7	10	11	14
	Roof bracket spacing	1192	993	662	596	458

Additional holding rail

**CAUTION****Do not exceed roof bracket spacing.**

- An additional holding rail is necessary if the maximum roof bracket spacing is exceeded.
- If the required number of roof brackets cannot be divided onto rafters, you must use an additional holding rail.
- Mount the additional holding rail to the bottom third of the collectors.

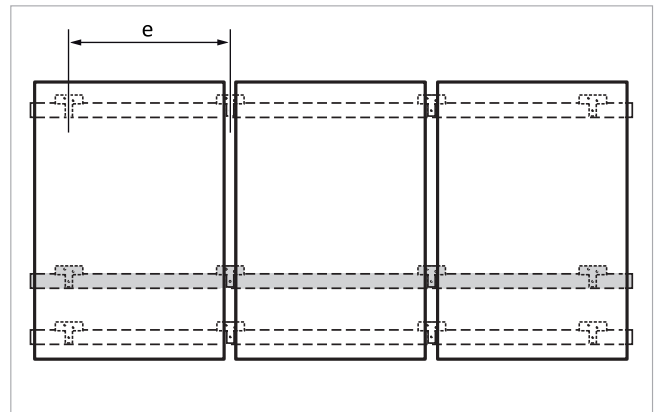


Fig. 13: Additional holding rail (horizontal installation)

4.3 Installing Roof Brackets and Rails

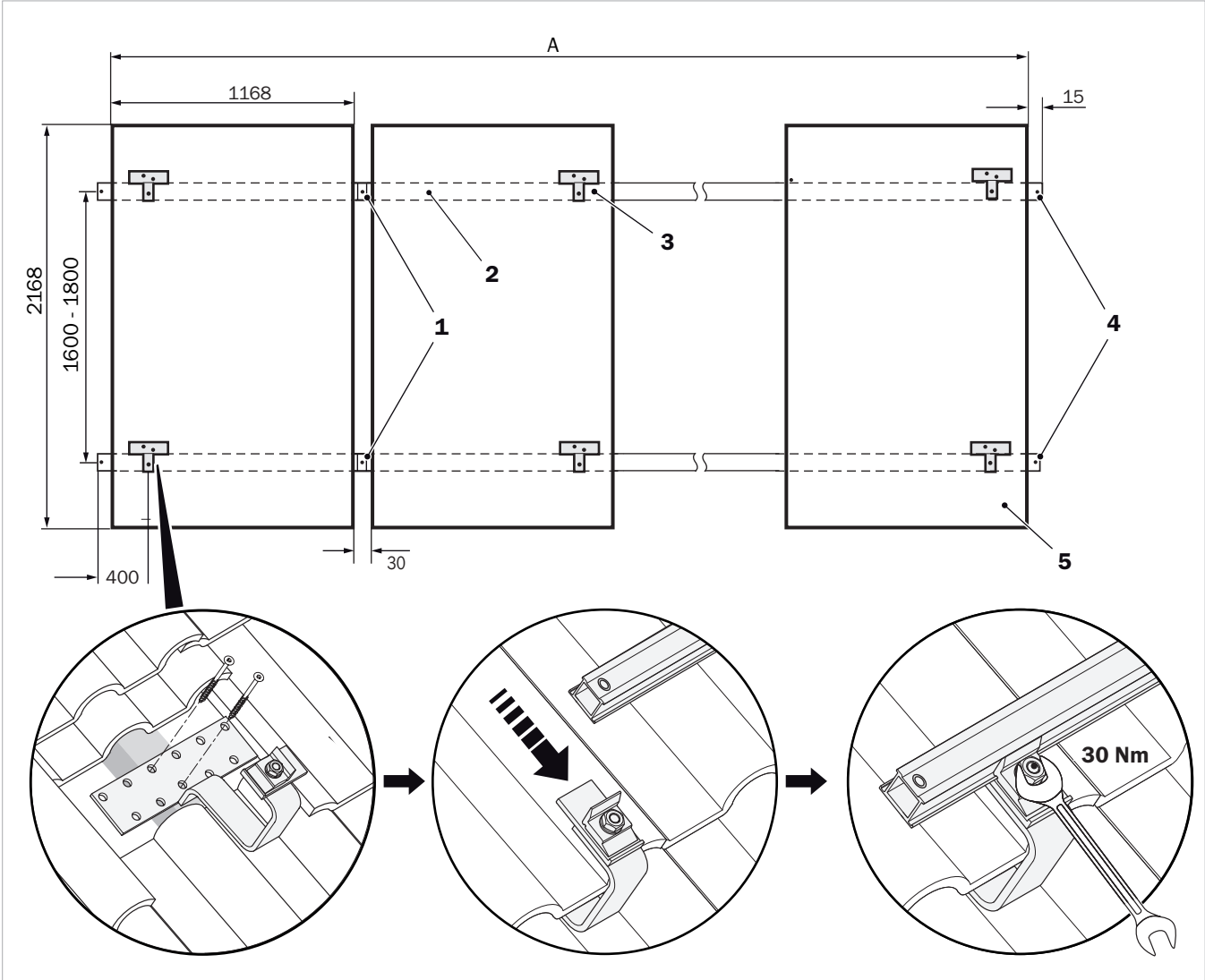


Fig. 14: Horizontal installation of the roof brackets and mounting rails.
The type of roof bracket varies depending on the roofing. Observe the installation instructions provided with the roof bracket.

- 1

Central clamp
- 2

Holding rail
- 3

Roof bracket
- 4

Edge clamp
- 5

Collector

Abbrevia- tion	Designation	Number of collectors				
		1	2	3	4	5
–	Total weight incl. holding rails	58 kg	101 kg	149 kg	197 kg	245 kg
A	Field width	1168	2366	3564	4762	5960

All dimension specifications in mm



For screw connections use screw paste, e.g. "OKS 250".

- Lower thread friction
- sufficient tightening torque
- good removability.

4.4 Collector Installation



WARNING

Burn hazard when there is direct sunlight

Fluid that remains in the collector or steam released from the collector can cause scalding. Touching hot connections may cause burns.

- Perform work on the collectors only when the sun is not shining or when the collectors are covered.
- Remove the sun protection only after the (re-) commissioning of the solar plant.



DANGER

Collectors sliding during installation

Collectors could fall from the roof.

- Observe and adhere to the relevant safety requirements when performing roofing work.
- Secure off a large enough area below the roof so as to prevent persons from entering it.
- Secure the collectors from sliding off the roof during roof installation.



Each collector must be fitted with two stop hooks for fall protection. They are included in the scope of delivery.

- One stop hook is attached to each outer edge of the lower retaining rail and moved inwards by approx. 200 mm.
- The stop hooks cannot be removed once the collectors have been attached and remain on the collector.



Fig. 15: Mounting the stop hook (2 per Collector)

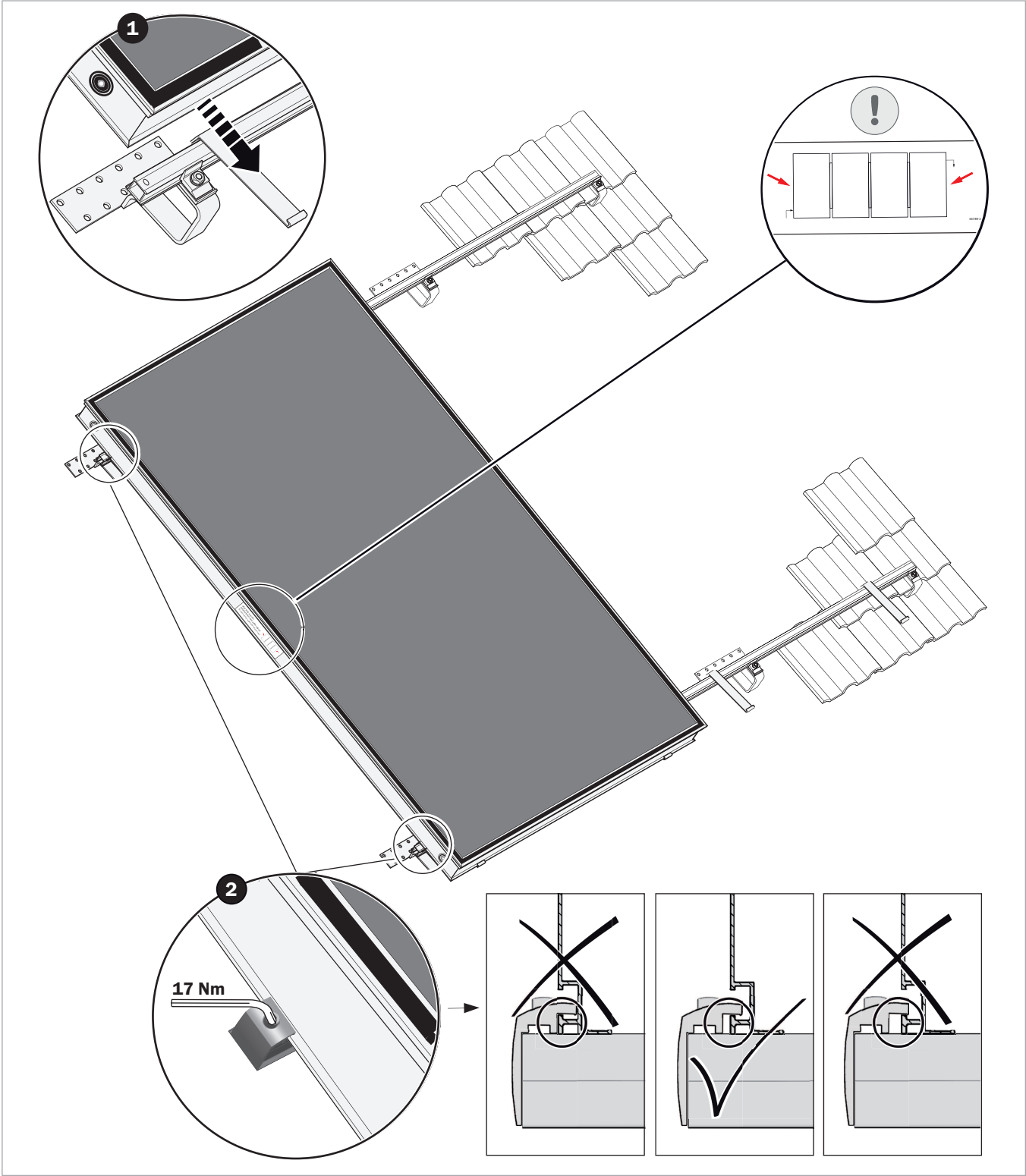


Fig. 16: Fastening a collector to the mounting rails

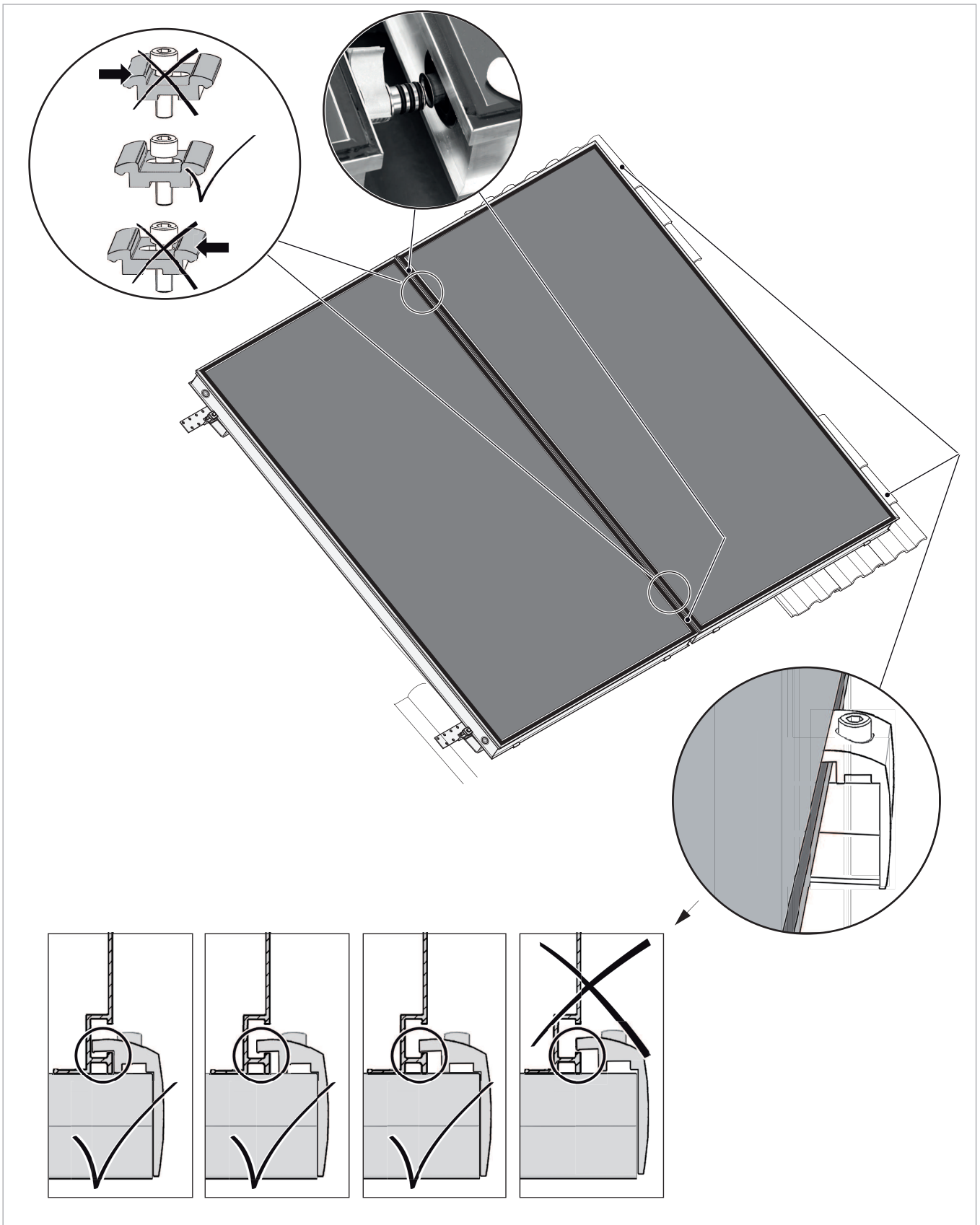


Fig. 17: Fastening the center and edge clamps, making the collector connection

4 Roof-Mounted Installation

Installing additional collectors

1. Place a central clamp in both the upper and lower holding rails loosely on the first collector.

Make sure that the clamps form a positive fit with the frame profile.

2. Do not tighten the clamps yet. This way the frame profile of the second collector can be added.



Fig. 18: Central clamps sitting loosely at first

3. Insert a collector connector into both the upper and lower connection of the collector until it reaches the stop.



Fig. 19: Inserting the collector connector

4. Place another collector on top and secure with hooks secure.
5. Carefully slide on the collector using the connections to the collector connector until it reaches the stop.



Fig. 20: Attaching collectors together

6. Lock the frame profile into the central clamps. Lift the central clamps if necessary.
7. Carefully align the collector and tighten the center clamps.

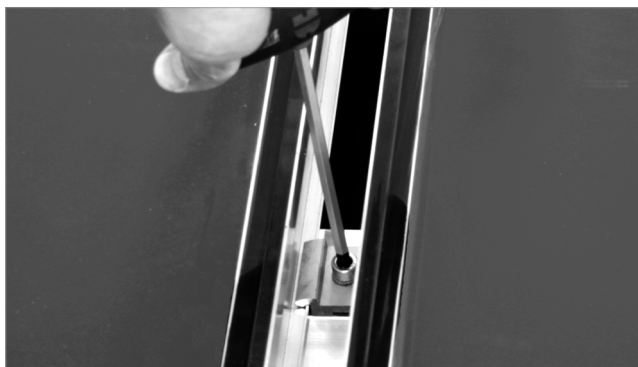


Fig. 21: Tightening the central clamps

8. Remove the spacer from both collector connectors.



Fig. 22: Remove spacers

9. Attach a safety clip to each collector connector.

Make sure that the connecting surfaces are touching one another closely so that the locking clips form a positive fit.



Fig. 23: Attaching the locking clip

10. Attach and fasten additional collectors in the same way.

5 Flat roof mounted installation

Flat roof holder (adjustable)

The solar system is installed on special flat roof holders that can be set to a slope angle between 25° and 60°.

5.1 Scope of Delivery

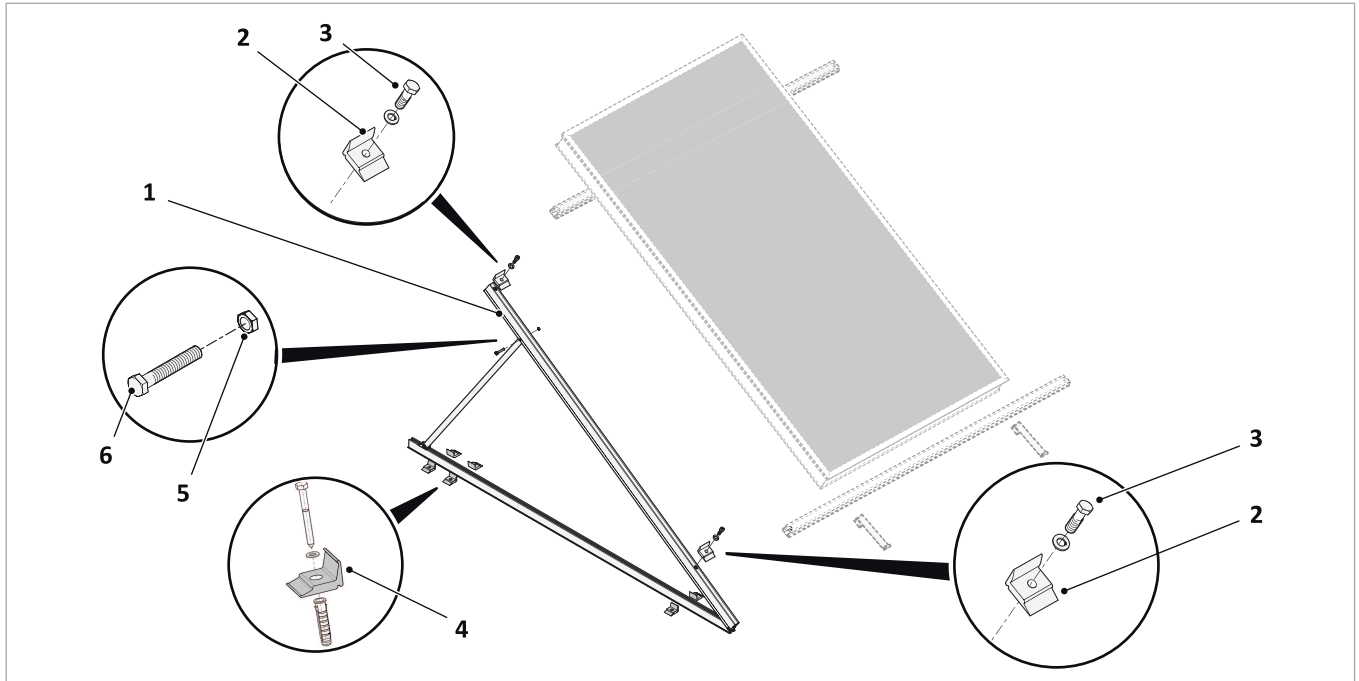


Fig. 24: Flat roof installation kit for SolvisCala, upright installation (collector and transverse rails are not included in the scope of delivery)

1	Flat roof holder	4	Clamping bracket (incl. concrete screws and wall plugs)
2	Clamping bracket for holding rail	5	M8 nut with locking serration
3	Hexagon screw M8 x 30 A2	6	Screw M8 x 40 A2

List of tools

- Allen key size 6, extended by at least 10 cm
- Ratchet with extension, 17 mm socket
- Wrenches: size 12, 13, 14, 15, 17 (2 x), 19, 21, 27
- Torque wrench
- Adjustable wrench, pipe wrench, nipper pliers
- Pencil, felt tip pen or chalk
- Folding metre ruler, 10 m measuring tape
- Measuring cord, spirit level
- Rubber mallet, hammer
- Cable drum, protective goggles
- Cordless screwdriver and/or drill

5.2 Structural Requirements

5.2.1 Edge and Corner Areas

Increased static loads occur at the edge area of the roof.



CAUTION

Observe the minimum edge spacing

- On flat roofs, all superstructures should maintain a minimum spacing of 1 m to the edge of the roof.

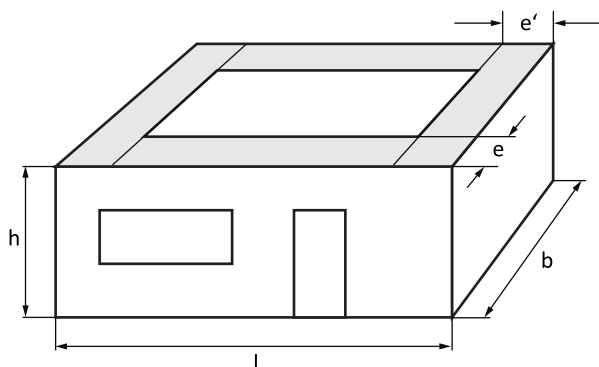
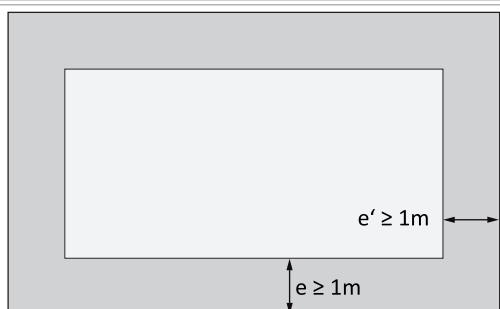


Fig. 25: Minimum spacing to edge of building

5.2.2 Structural Design

The following static designs only apply if all static requirements are met.



The information applies to concrete block. Please ask for the values for other ballastings!



Contact our Technical Sales department if you have any questions.

Load class

Load classes were defined to simplify the design.

The snow and wind load zones must be identified before determining the load class, see → section "Snow and Wind Load Zones", p. 46.

Load classes are the result of different combinations of snow load zones and heights above sea level.

Flat roof mounted installation of SolvisCala 30° - vertical / static design

- Valid up to and including wind load zone IV (only applicable in Germany).
- for load class A
- Installation height **up to 15 m** above ground level.
- Terrain category: **inland mixed profile**.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 650 m	A	3	4	5	6
1a	up to 550 m					
2	up to 380 m					
2a	up to 300 m					
3	up to 270 m					
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
I	0 - 8 m		369	554	738	923
	8 - 15 m		492	738	984	1230
II	0 - 8 m		472	708	944	1180
	8 - 15 m		622	933	1244	1555
III	0 - 8 m		590	885	1180	1475
	8 - 15 m		771	1157	1542	1928
IV	0 - 8 m		722	1083	1444	1805
	8 - 15 m		938	1407	1876	2345

Flat roof mounted installation of SolvisCala 30° - vertical / static design

- Valid up to and including wind load zone IV (only applicable in Germany).
- for load class B
- Installation height **up to 15 m** above ground level.
- Terrain category: **inland mixed profile**.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 800 m	B	3	5	6	8
1a	up to 700 m					
2	up to 500 m					
2a	up to 430 m					
3	up to 370 m					
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
I	0 - 8 m		369	554	738	923
	8 - 15 m		492	738	984	1230
II	0 - 8 m		472	708	944	1180
	8 - 15 m		622	933	1244	1555
III	0 - 8 m		590	885	1180	1475
	8 - 15 m		771	1157	1542	1928
IV	0 - 8 m		722	1083	1444	1805
	8 - 15 m		938	1407	1876	2345



The information applies to concrete block. Please ask for the values for other ballastings!

5 Flat roof mounted installation

Flat roof mounted installation of SolvisCala 30° - vertical / static design

- Valid up to and including wind load zone IV (only applicable in Germany).
- for load class C
- Installation height up to 15 m above ground level.
- Terrain category: inland mixed profile.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 900 m	C	4	6	8	10
1a	up to 800 m					
2	up to 550 m					
2a	up to 500 m					
3	up to 430 m					
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
I	0 - 8 m		416	624	832	1040
	8 - 15 m		552	828	1104	1380
II	0 - 8 m		529	794	1058	1323
	8 - 15 m		695	1043	1390	1738
III	0 - 8 m		659	989	1318	1648
	8 - 15 m		858	1287	1716	2145
IV	0 - 8 m		804	1206	1608	2010
	8 - 15 m		1041	1562	2082	2603

Flat roof mounted installation of SolvisCala 30° - vertical / static design

- Valid for wind load zone IV (only applicable in Germany).
- Installation height up to 15 m above ground level.
- Terrain category: near the coast.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 200 m	N/A	3	4	5	6
1a	up to 200 m					
2	up to 200 m					
2a	up to 200 m					
3	up to 200 m					
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
II	0 - 8 m		692	1038	1384	1730
	8 - 15 m		839	1259	1678	2098
III	0 - 8 m		855	1283	1710	2138
	8 - 15 m		1031	1547	2062	2578
IV	0 - 8 m		1038	1557	2076	2595
	8 - 15 m		1248	1872	2496	3120

i The information applies to concrete block. Please ask for the values for other ballastings!

Flat roof mounted installation of SolvisCala 45° - vertical / static design

- Valid for wind load zones I, II and III (only applicable in Germany).
- for load class A
- Installation height **up to 15 m** above ground level.
- Terrain category: **inland mixed profile**.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 950 m	A	3	4	5	6
1a	up to 880 m					
2	up to 700 m					
2a	up to 600 m					
3	up to 530 m					
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
I	0 - 8 m		514	771	1028	1285
	8 - 15 m		658	987	1316	1645
II	0 - 8 m		634	951	1268	1585
	8 - 15 m		810	1215	1620	2025
III	0 - 8 m		772	1158	1544	1930
	8 - 15 m		983	1475	1966	2458

Flat roof mounted installation of SolvisCala 45° - vertical / static design

- Valid for wind load zones I, II and III (only applicable in Germany).
- for load class B
- Installation height **up to 15 m** above ground level.
- Terrain category: **inland mixed profile**.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 1100 m	B	3	5	6	8
1a	up to 1000 m					
2	up to 850 m					
2a	up to 800 m					
3	up to 700 m					
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
I	0 - 8 m		586	879	1172	1465
	8 - 15 m		748	1122	1496	1870
II	0 - 8 m		722	1083	1444	1805
	8 - 15 m		920	1380	1840	2300
III	0 - 8 m		877	1316	1754	2193
	8 - 15 m		1116	1674	2232	2790



The information applies to concrete block. Please ask for the values for other ballastings!

5 Flat roof mounted installation

Flat roof mounted installation of SolvisCala 45° - vertical / static design

- Valid for wind load zones I, II and III (only applicable in Germany).
- for load class C
- Installation height **up to 15 m** above ground level.
- Terrain category: **inland mixed profile**.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 1200 m	C	4	6	8	10
1a	up to 1150 m					
2	up to 950 m					
2a	up to 880 m					
3	up to 800 m					
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
I	0 - 8 m		633	950	1266	1583
	8 - 15 m		809	1214	1618	2023
II	0 - 8 m		780	1170	1560	1950
	8 - 15 m		994	1491	1988	2485
III	0 - 8 m		947	1421	1894	2368
	8 - 15 m		1205	1808	2410	3013

Flat roof mounted installation of SolvisCala 45° - vertical / static design

- Valid for wind load zone IV (only applicable in Germany).
- Installation height **up to 8 m** above ground level.
- Terrain category: **near the coast**.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 200 m	N/A	3	5	6	8
2	up to 200 m					
3	up to 200 m					
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
IV	0 - 8 m		1112	1668	2224	2780



The information applies to concrete block. Please ask for the values for other ballastings!

Flat roof mounted installation of SolvisCala 60° - vertical / static design

- Valid for wind load zones I and II (only applicable in Germany).
- for load class A
- Installation height **up to 15 m** above ground level.
- Terrain category: **inland mixed profile**.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 950 m	A	3	4	5	6
1a	up to 950 m					
2	up to 950 m					
2a	up to 950 m					
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
I	0 - 8m		837	1256	1674	2093
	8 - 15m		1069	1604	2138	2673
II	0 - 8m		1030	1545	2060	2575
	8 - 15m		1313	1970	2626	3283

Flat roof mounted installation of SolvisCala 60° - vertical / static design

- Valid for wind load zone III (only applicable in Germany).
- for load class B
- Installation height **up to 15 m** above ground level.
- Terrain category: **inland mixed profile**.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 200 m	B	3	5	6	8
1a	up to 200 m					
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
III	0 - 8 m		1082	1623	2164	2705
	8 - 15 m		1379	2069	2758	3448

Flat roof mounted installation of SolvisCala 60° - vertical / static design

- Valid for wind load zone IV (only applicable in Germany).
- for load class C
- Installation height **up to 8 m** above ground level.
- Terrain category: **near the coast**.

Snow load zone	Height above sea level	Load class	required flat roof stands in [pcs.] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
1	up to 150 m	N/A	4	6	8	10
Wind load zone	Installation height above ground level		required total load in [kg] for SolvisCala side by side (pcs.) ...			
			2 x C-254	3 x C-254	4 x C-254	5 x C-254
IV	0 - 8 m		1816	2724	3632	4540



The information applies to concrete block. Please ask for the values for other ballastings!

5.3 Installation with Weights

Load distribution

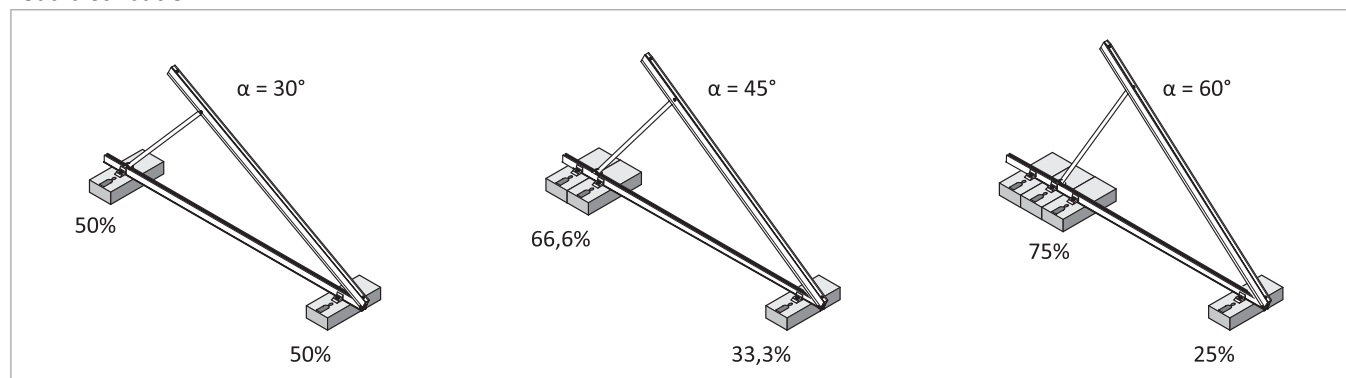


Fig. 26: Load distribution at slope angle $\alpha = 30^\circ / 45^\circ / 60^\circ$



CAUTION

Hazard due to overloading the building

- As the system (solar module + holder + weights) has a significant weight load, always check the structural calculations for the building bearing the load before beginning installation.



If the required ballast taken from the relevant table cannot be applied to the roof for structural reasons, an assessment of the individual circumstances is worthwhile. For this purpose, please send the completed statics project sheet for the installation of the collector (PRB-KOL, see → chapter "Statics project sheet for the installation of the collector" on page 48) to Solvis application consultancy; for phone numbers, see → chapter "Information About These Instructions" on page 2.

Superimposed loads

The superimposed loads can be made from any material. It is important that they ensure long-lasting protection against wind loads for the service life of the collectors. Higher superimposed loads are required for gravel fills. For more information, please contact the application consultancy team (for the phone number, see → chapter "Information About These Instructions", page 2).

Example for load distribution

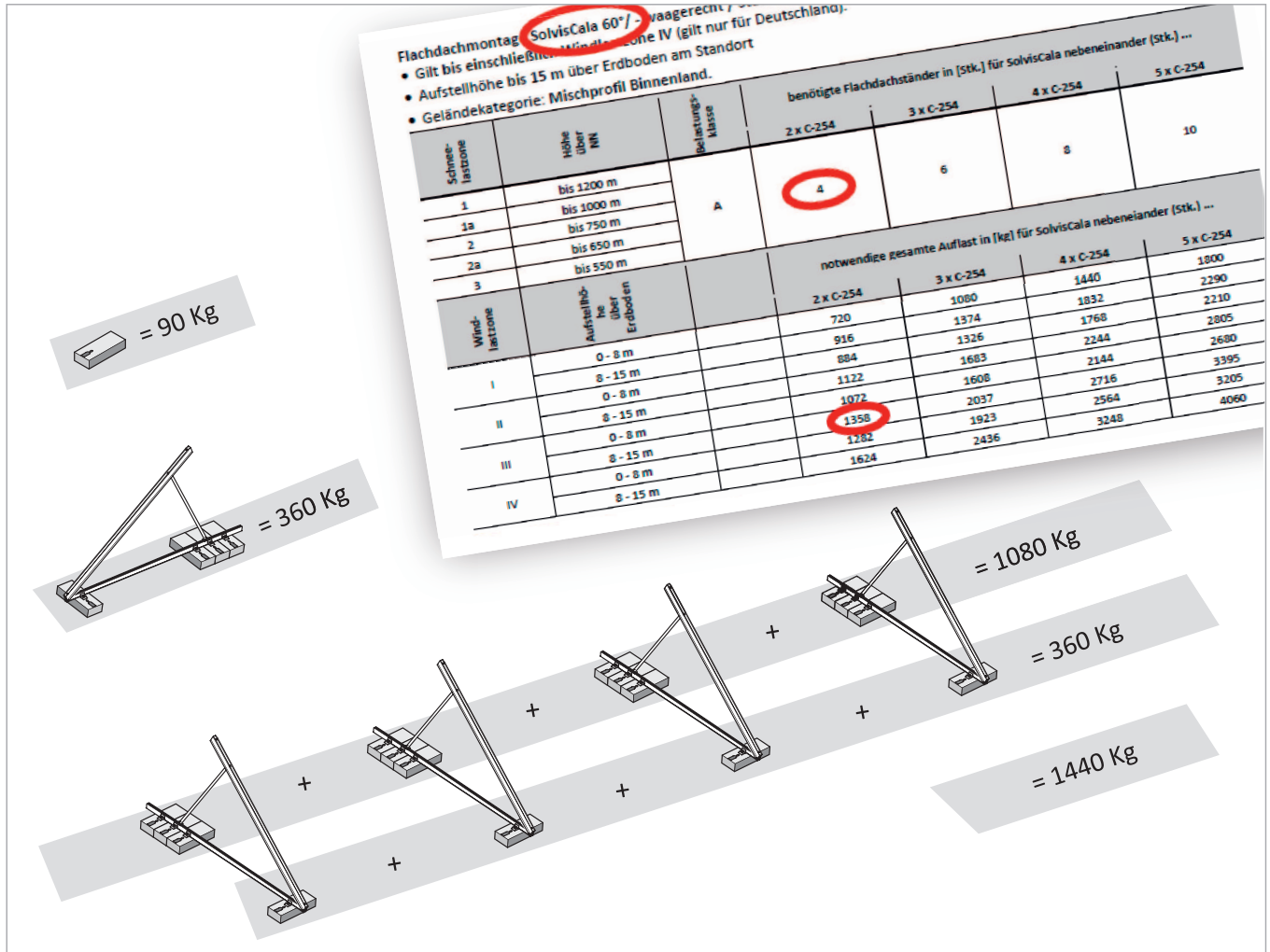


Fig. 27: Example for load distribution

5.4 Placement

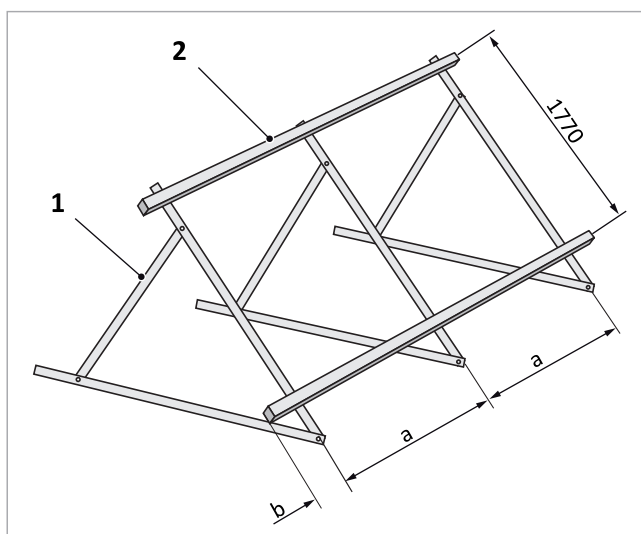


Fig. 28: Flat roof holder clearances

- 1 Flat roof holder
- 2 Holding rail
- a Holder spacing
- b Collector overhang = a/2

Number of required flat roof holders and spacing

Designation	Number of collectors			
	2 x	3 x	4 x	5 x
Number of flat roof holders (load class A)	3	4	5	6
Holder spacing (a) ± 50 [mm]	799	899	958	998
Collector overhang (b) ± 50 [mm]	399	449	479	499
Number of flat roof holders (load class B)	3	5	6	8
Holder spacing (a) ± 50 [mm]	799	719	799	749
Collector overhang (b) ± 50 [mm]	399	359	399	374
Number of flat roof holders (load class C)	4	6	8	10
Holder spacing (a) ± 50 [mm]	599	599	599	599
Collector overhang (b) ± 50 [mm]	300	300	300	300

5 Flat roof mounted installation

Determining the installation angle

Installation angle (= slope angle) α°	Installation angle setting [mm]	
	c	Shortening size for $S^{1)}$
25	311	690
30	89	420
35	400	420
40	603	420
45	112	-
50	383	-
55	707	-
60	1075	-

¹⁾ At an installation angle smaller or equal than 40° , it is necessary to shorten the support rail S by the measurement specified.

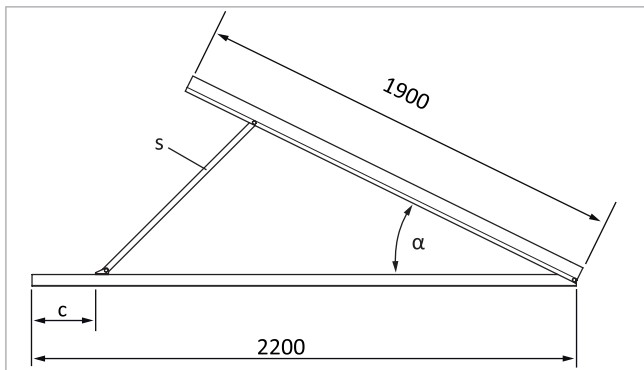


Fig. 29: Flat roof holder, dimensions and installation angle

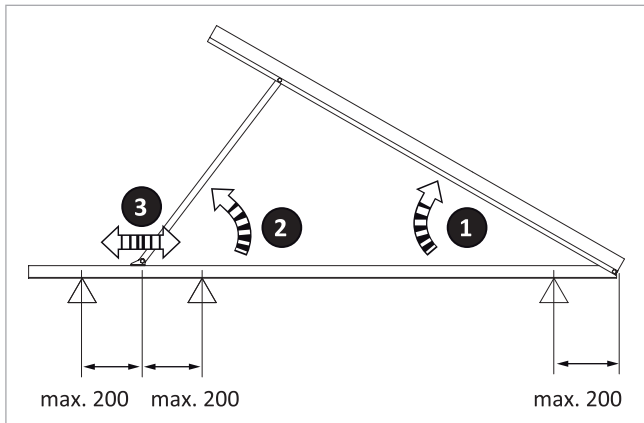


Fig. 30: Setting up the flat roof holder

5.4.1 Low Slope Surfaces

Low Slope Surfaces



A statics calculation for the specific circumstances is needed to determine the number of roof brackets required. For this purpose, please send the completed statics project sheet for the installation of the collector (PRB-KOL – for more information, see → chapter “Statics project sheet for the installation of the collector” on page 48) to Solvis application consultancy. For telephone numbers, see → chapter “Information About These Instructions” on page 2.



Contact our Technical Sales department if you have any questions.

Low slope surfaces ($10^\circ - 40^\circ$) present special cases in terms of setting up flat roof holders.

If the collectors are to be installed on low slope surfaces (roof slope angle in relation to horizontal = γ) using flat

roof holders, a flat roof holder installation angle ($=\beta$) of a maximum of 20° is permitted. The overall slope of the collector α in relation to horizontal may not exceed 60° .

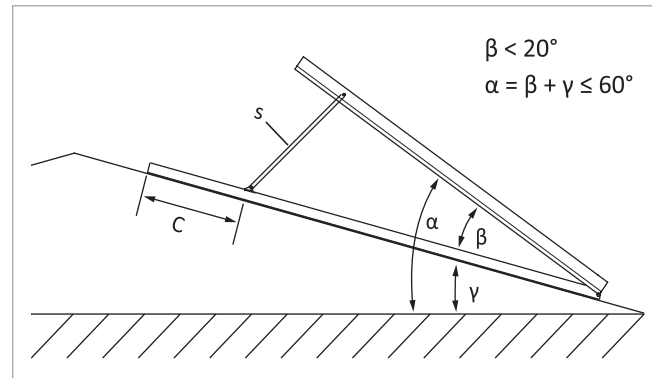


Fig. 31: Angle on low slope surfaces

Determining the installation angle - special case

Installation angle β°	Installation angle setting (mm)	
	c	Shortening size for $S^{1)}$
10	9	900
15	158	900
20	46	690

¹⁾ At an installation angle smaller or equal than 20° , it is necessary to shorten the support rail S by the measurement specified. After shortening the support rail, drill an 8 mm hole in the support rail (in the same position as the original hole).

5.5 Wall-Mounted Installation

Installation variants

Solvis collectors, wall-mounted
Orientation: upright only
for heights up to 3 m $\alpha = 90^\circ$
max. 3 m $\alpha = 90^\circ$

For wall-mounted installation up to a slope angle of 74° , flat roof holders are screwed on to customer-provided substructures or are fastened directly to the wall with wall plugs (provided the wall has sufficient load-bearing capacity). For this, holes are drilled in the centre of the bottom rail.

For thermally insulated façades, make sure that the foundation has sufficient compressive strength. Appropriate fixing materials can be purchased from producers of thermal insulation systems.

The fixing material you choose (wall plugs, etc.) must meet static requirements and be suitable for the on-site brick-work.

Minimum pull-out loads of the wall plugs

Applies for directly fastening the flat roof holders to the wall:

- 2 kN for buildings up to 8 m tall
- 3 kN for buildings between 8 and 20 m tall

If these values cannot be reached, then more attachment points must be sought. For example, a customer-provided substructure of horizontal rails to which the flat roof holders are screw-fastened.



The construction party is responsible for providing on-site support structures.

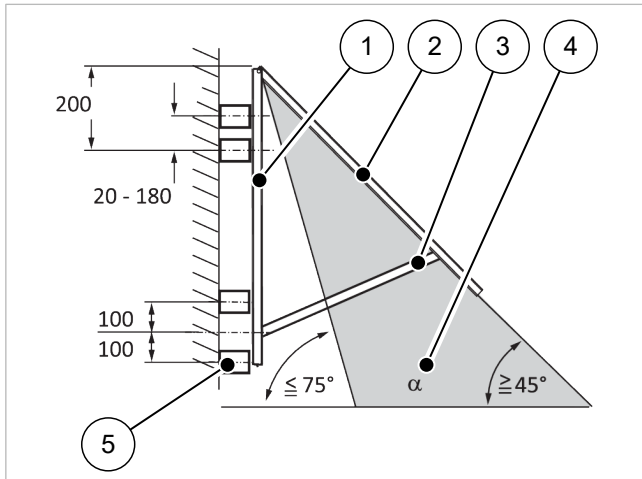


Fig. 32: Assembly of the holders on the wall

- 1 Bottom rail
- 2 Bearing rail
- 3 Support rail
- 4 Slope angle α ($75^\circ - 45^\circ$)
- 5 On-site connection according to construction and static specifications (installation example)

Where possible, install the collector at an angle to the wall. Use the holders described in the installation instructions for this.

For angles larger than 60° (e.g. vertical installation on the wall), fit the top of the collectors with a cover plate on site. During heavy rainfall, water could otherwise get into the collector via the ventilation holes. Metal flashing should also be secured against effects of the wind.

An additional cover plate is not necessary if the roof offers sufficient protection.

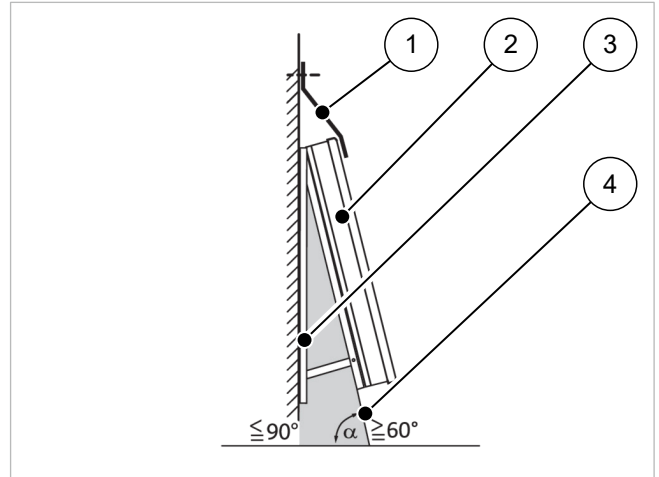


Fig. 33: Collector with cover plate

- 1 Cover plate (on-site)
- 2 Collector
- 3 Flat roof holder
- 4 Slope angle α ($90^\circ - 60^\circ$)

5.6 Flat Roof Holder Installation

5.6.1 Installation on Steel Girders

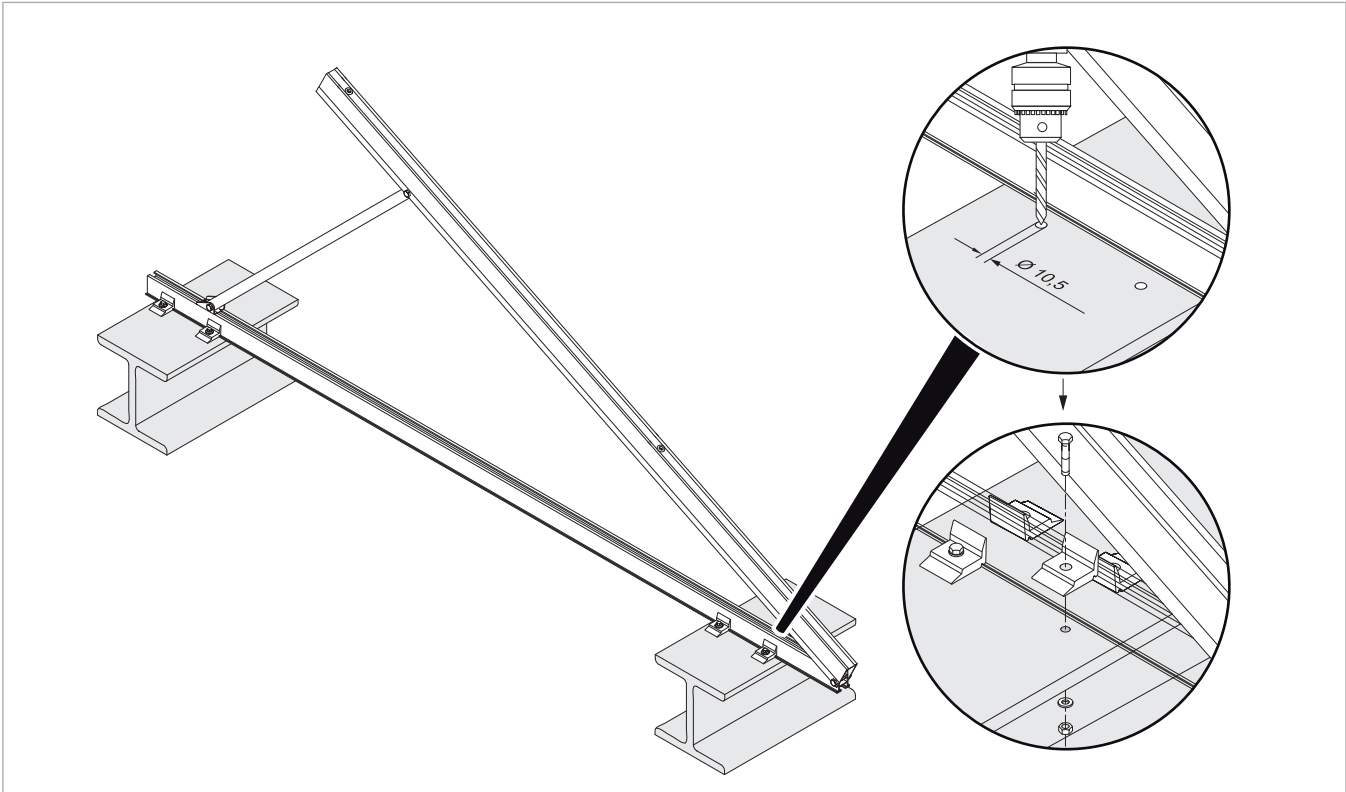


Fig. 34: Flat roof holder installation on steel girders

5.6.2 Steel girder (self-tapping)

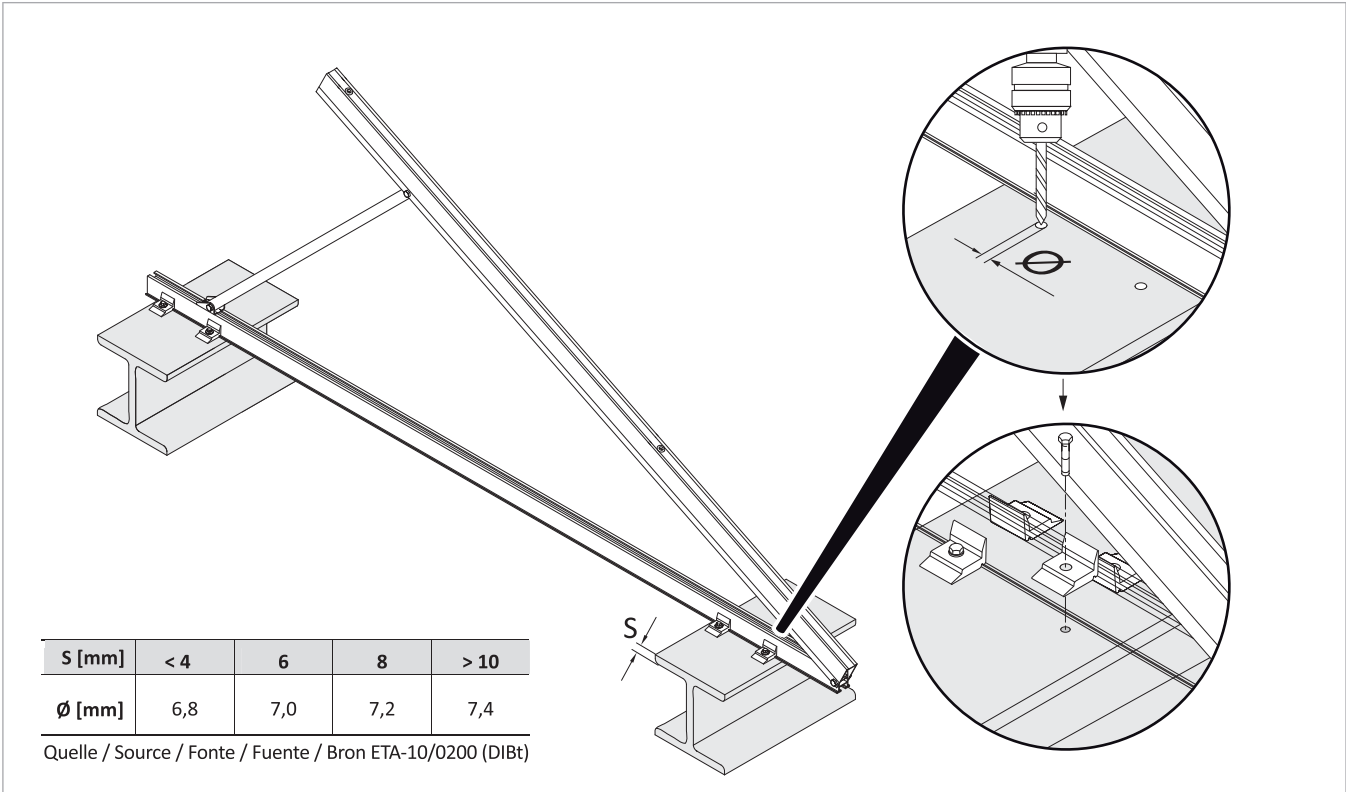


Fig. 35: Installation of the flat roof holder on a steel girder with self-tapping screws (flat roof holder set MUK)

5.6.3 Installation on Concrete Blocks

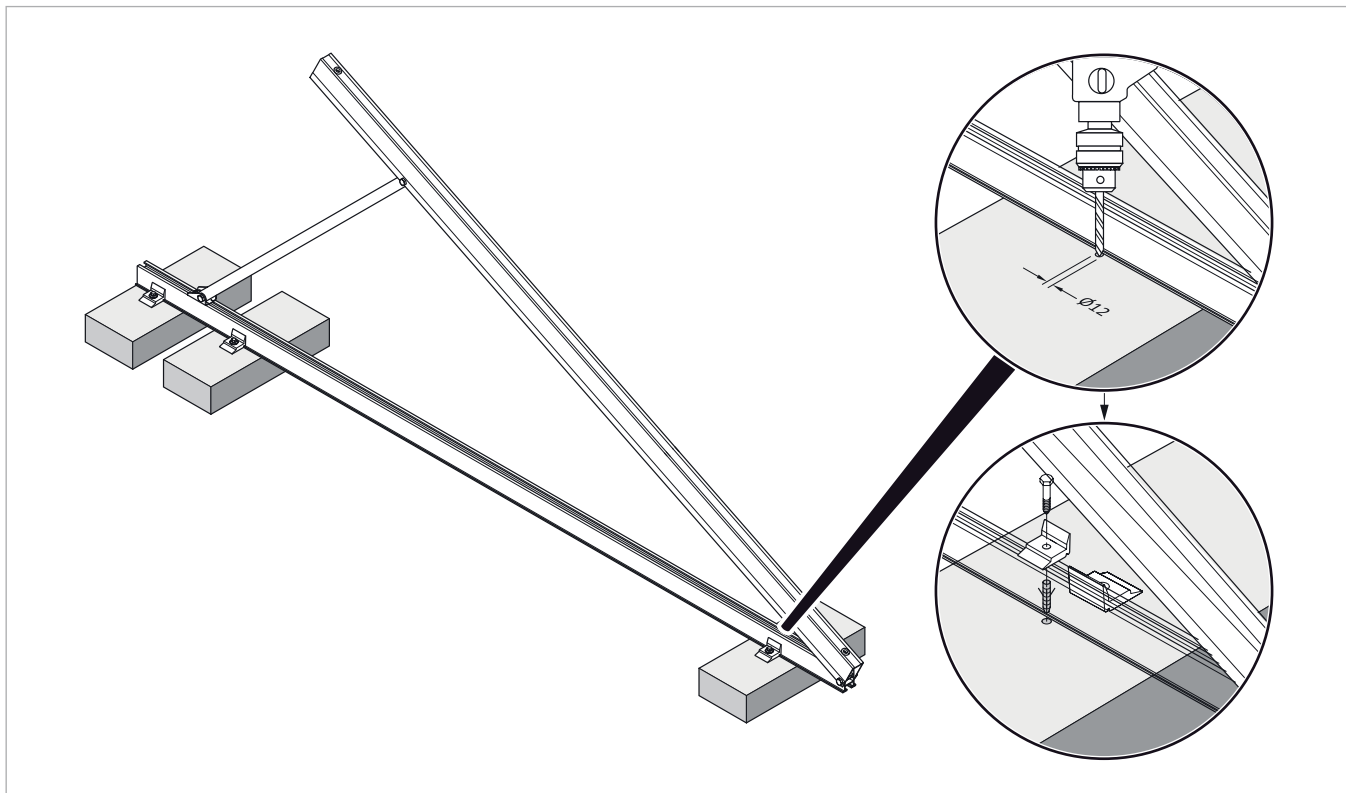


Fig. 36: Flat roof holder installation on concrete blocks

5.6.4 Roof-mount frame ADH-U

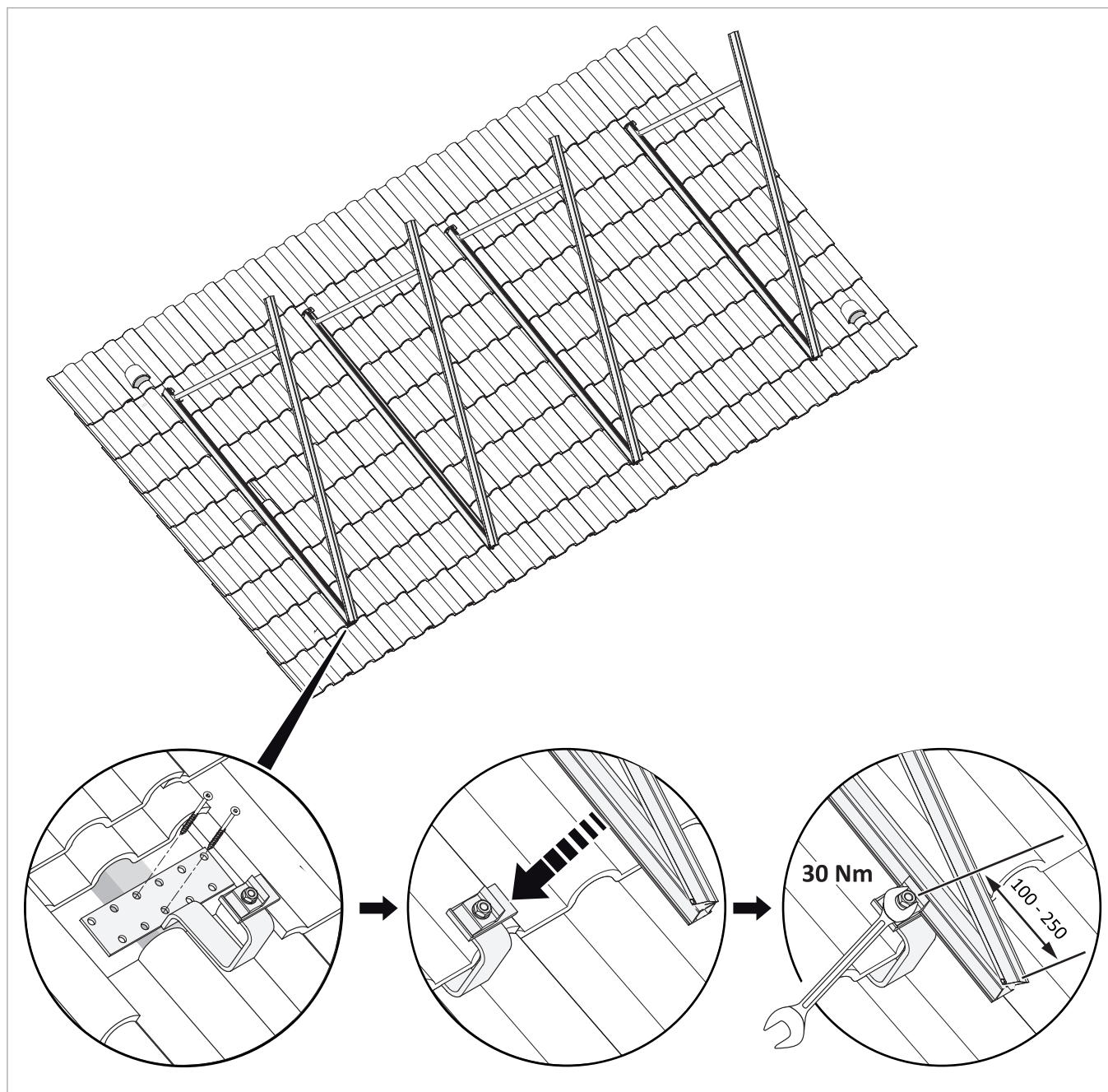


Fig. 37: Installation of the flat roof holder on a roof-mount frame ADH-U

5.6.5 Installation on Trapezoidal Sheet Metal

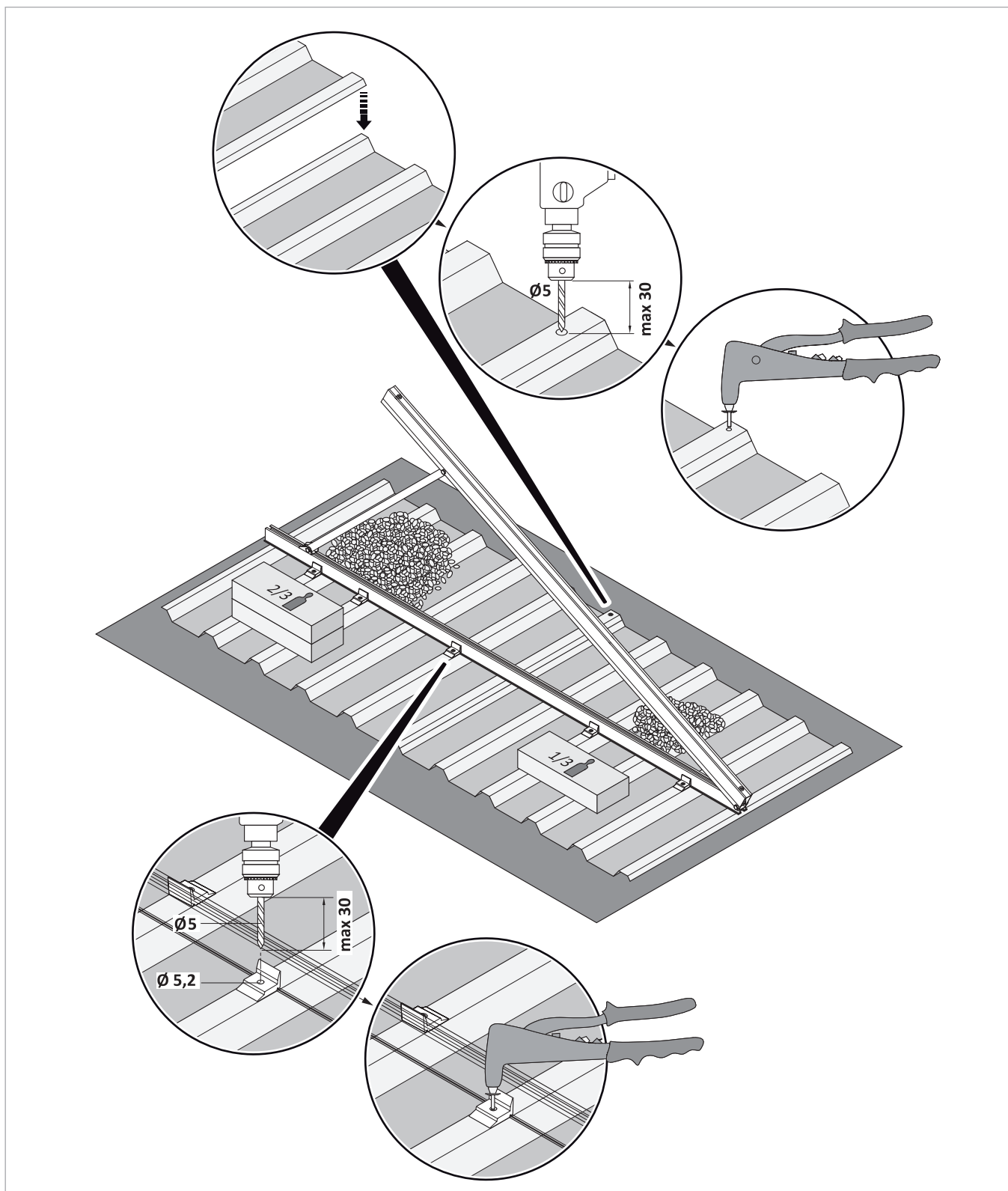


Fig. 38: Flat roof holder installation on trapezoidal sheet metal

**CAUTION****Be careful when drilling the roofing**

Possible building damage due to moisture

- Drill carefully
- Place a protective layer underneath

5.7 Collector Installation

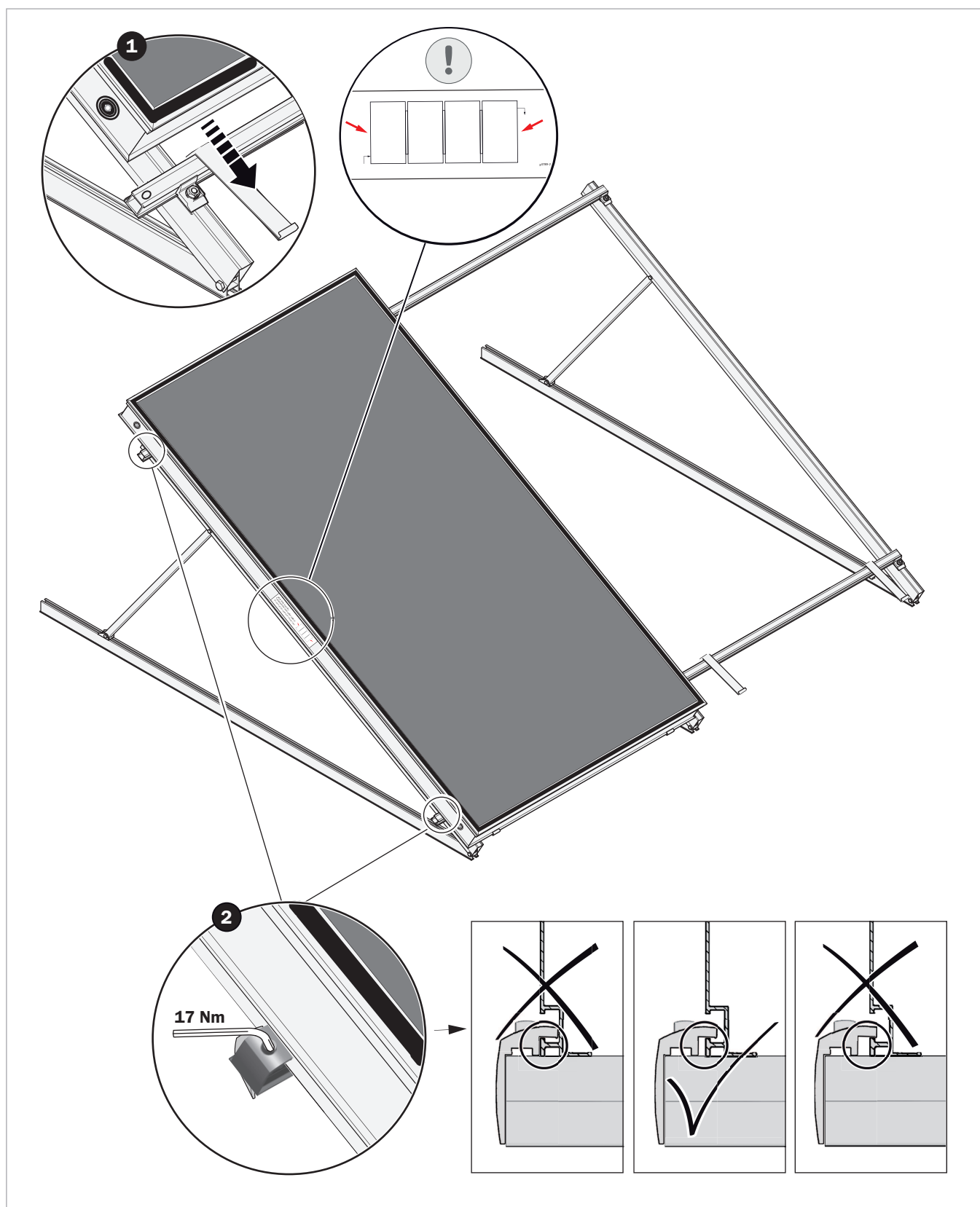


Fig. 39: Fastening a collector to flat roof holders

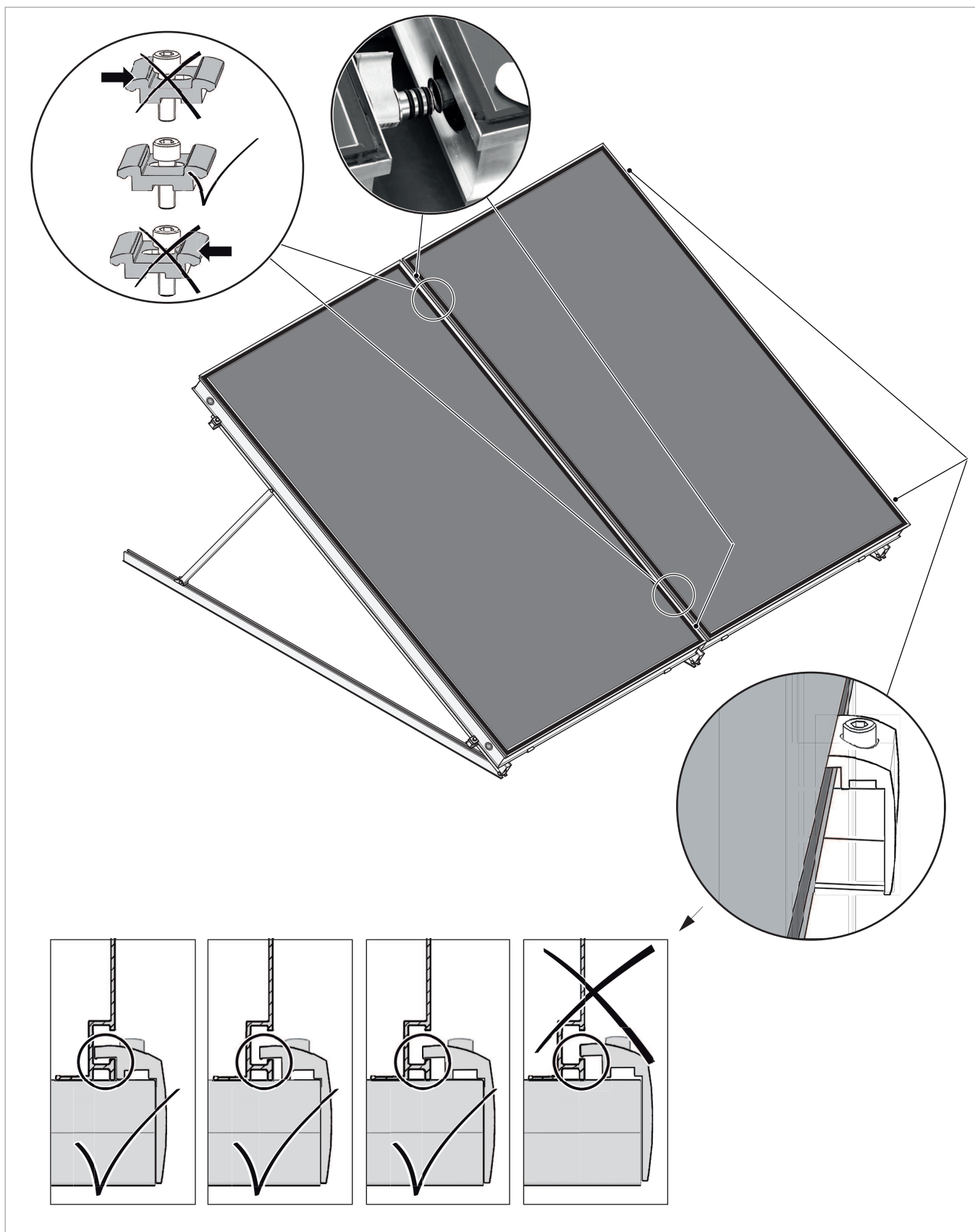


Fig. 40: Fastening the center and edge clamps, making the collector connection

5 Flat roof mounted installation

Installing additional collectors

1. Place a central clamp in both the upper and lower holding rails loosely on the first collector.

Make sure that the clamps form a positive fit with the frame profile.

2. Do not tighten the clamps yet. This way the frame profile of the second collector can be added.



Fig. 41: Central clamps sitting loosely at first

3. Insert a collector connector into both the upper and lower connection of the collector until it reaches the stop.



Fig. 42: Inserting the collector connector

4. Place another collector on top and secure with hooks secure.
5. Carefully slide on the collector using the connections to the collector connector until it reaches the stop.



Fig. 43: Attaching collectors together

6. Lock the frame profile into the central clamps. Lift the central clamps if necessary.
7. Carefully align the collector and tighten the center clamps.

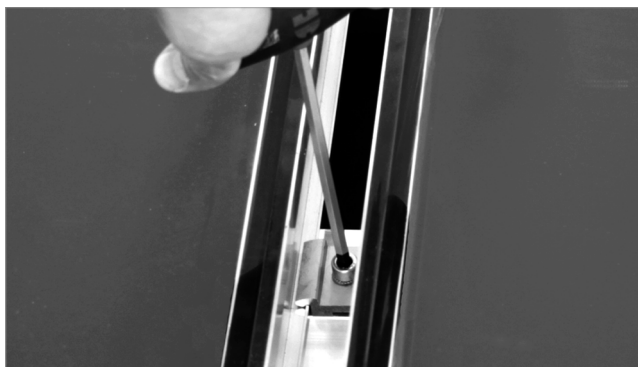


Fig. 44: Tightening the central clamps

8. Remove the spacer from both collector connectors.



Fig. 45: Remove spacers

9. Attach a safety clip to each collector connector.

Make sure that the connecting surfaces are touching one another closely so that the locking clips form a positive fit.



Fig. 46: Attaching the locking clip

10. Attach and fasten additional collectors in the same way.

6 Hydraulic Connection and Installing the Sensors

Connecting the collectors to the solar station

The collectors can be connected in several variations, see → Fig. 9, p. 13.

1. Close off connections that are not needed.
2. Dummy plugs Secure with safety clip.



Fig. 47: Dummy plug

3. Insert the collector return connection into the corresponding lower collector connection and secure with a safety clip.



Fig. 48: Solar return

4. Insert the collector flow connection into the corresponding upper collector connection and secure with a safety clip.



Fig. 49: Connecting solar flow

5. Continue the pipework to the solar station, e.g. with Solvis quick-mounting pipe (SMR).

The pipes must be insulated in accordance with country-specific regulations (Germany: Building Energy Act, GEG). The materials used must be temperature-resistant up to at least 150 °C, UV and weather-resistant and protected against animal browsing.

Outlet turret

Vent tiles that are made for most roofing are particularly well suited for the outlet turret of the solar lines.

Installing the collector sensor

i The collector sensor is pushed into the sensor sleeve (internal diameter 5.7 mm) on the collector flow connection.

1. Push the sensor into the sensor sleeve as far as it can go.
2. Seal the PG screw fitting tightly.

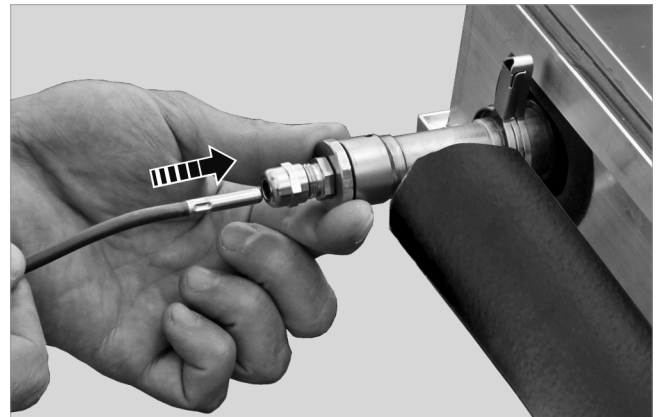


Fig. 50: Installing the sensor

Installing the lightning protection box

1. To protect the control from overvoltage, place a lightning protection box as close as possible to the collector (beneath the roof, for example).
2. Then extend the sensor cable over the lightning protection box connection to the control.

i An optional lightning protection box can be found in our price list.



CAUTION

Pay attention to the sensor line when extending.

- The line you use must at least meet the requirements for temperature and UV radiation in the installation location.
- Use only shielded lines.
- Use a protective conduit to prevent damage by animals or mechanical strain.
- For extension up to 50 m: (2-wire, 0.75 mm²)
- For extension over 50 m: (2-wire, 1.5 mm²)

7 Start-Up

Before commissioning, check the solar circuit for leaks using compressed air. Observe the blow-off pressure of the safety valve!



WARNING

Risk of hot steam escaping when working on the solar system

Scalding of hands and face possible.

- Carry out work on solar syst. only when there is no direct sunl. or when collect. are covered.



CAUTION

When filling the solar circuit:

- Fill only with original Tyfocor LS-rot ready-mixed heat transfer fluid and flush.
- Using other types of heat transfer fluid in this system is prohibited because it may damage the solar circuit components.
- Use only the Füll-Jet unit to flush and fill the system (please order separately).

Heat transfer medium

Solvis only provides a warranty when using the Tyfocor LS-rot heat transfer medium, which has been specially adapted to the Solvis systems and collectors. The safety data sheet in accordance with Regulation (EC) No. 1907/2006 can be downloaded from the Solvis website.



See document → [Technical Information Tyfocor LS-rot \(TNF-TY-LS-R\)](#)

Setting the solar operating pressure

1. Set the solar operating pressure approx. 0.3 bar higher than the admission pressure of the solar expansion vessel (e.g. admission pressure 3.1 bar, solar operation pressure 3.4 bar).
2. When the solar operating pressure has been reached, close the flushing valve.

The collector can be operated with an operating pressure of up to 6 bar. However, the higher the pressure, the higher the temperature load on the solar fluid. Therefore, do not set the pressure higher than calculated.



A calculation table sheet for the expansion vessel design (and a primary solar tank where applicable) and for determining the admission pressure and system filling pressure can be downloaded using the following link:



https://extranet.solvis.de/public/user_upload/MAG_Nachdruckhaltung_ab.xls



Fill, pressure test and start up system as per → 'Start-Up' chapter of installation instructions for relevant system.

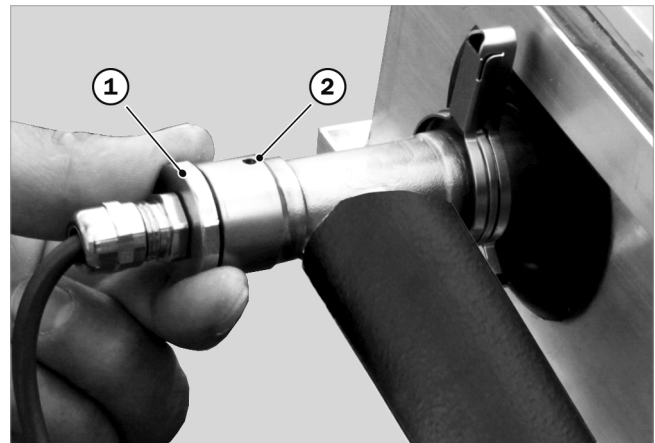


Fig. 51: Bleeders on the collector

- 1 Bleeder valve
- 2 Bleeder opening

Completing the start-up

1. Check the system for leaks.
2. Dismantle the flushing and filling pump.
3. Switch on the controller.
4. Check the flow rates, temperatures and pressures, and, if necessary, adjust system-specific values on the controller.



In the first days after start-up, bleed the bleeder valve of the solar station (if present) daily and later at longer intervals.

8 Maintenance

**WARNING**

Risk of hot steam escaping when working on the solar system

Scalding of hands and face possible.

- Carry out work on solar syst. only when there is no direct sunl. or when collect. are covered.

Checking the solar liquid (annually)

1. Bleed the solar circuit and take a sample at the same time.
2. Perform a sensory test. Replace the solar liquid if there is a pungent odour or dark colour.
3. Check the antifreeze using the antifreeze refractometer.
4. Test the pH value with a test strip. (If the pH value is below 8.0, replace the solar liquid.)
5. Check the solar operating pressure.

Checking the solar expansion vessel admission pressure and refill with nitrogen if necessary (every 2 years)**Checking the flow (every 2 years)**

1. Switch on the solar pump (manual mode).
2. Check the flow at the flow meter on the primary solar circuit (collector circuit).

Checking the sensor values

1. Check that the measured temperatures are plausible.

Checking the solar circuit

1. Check all the components and safety valves on the solar station for leaks and ensure that they are functioning properly.
2. Visually check the collector(s), pipe lines, and associated insulation.
3. Check that the collector mounting system is positioned and functioning correctly.

9 Decommissioning

If the system is taken out of operation for a longer period or permanently it must be drained. Collect the solar fluid and dispose of it properly.

Ensure that as little solar fluid residue as possible remains in the collectors. For this reason, the solar circuit should preferably be drained using compressed air.



CAUTION

Risk of deposits

- Once the collector has been previously filled with solar liquid, it may not be exposed to sunlight when empty.

Observe the safety notes when disassembling the system, see → section “Safety Notes”, p. 5.



WARNING

Burn hazard when there is direct sunlight

Fluid that remains in the collector or steam released from the collector can cause scalding. Touching hot connections may cause burns.

- Perform work on the collectors only when the sun is not shining or when the collectors are covered.
- Remove the sun protection only after the (re-) commissioning of the solar plant.

Environmentally-sound reuse

Old Solvis collectors may be returned to the factory free of charge and then recycled in an environmentally friendly manner.

10 Technical Data

10.1 Technical data on collectors

SolvisCala 254 EasyCon

Designation	Features, values
Collector type	Flat-plate collector
Max. output	1.87 kW
Dimensions	2,168 x 1,168 x 93 mm
Gross surface area	2.53 m ²
Aperture area	2.41 m ²
Absorber surface area	2.38 m ²
Standstill temperature (at 1,000 W/m ²)	210 °C
Total weight	41 kg
Absorber type	Aluminium with Miro-Therm® coating (95% absorption, 5% emission)
Glass transmission	> 93,5 %
Solar Keymark certificate number	011-7S3260 F
Amount of solar liquid	1.8 l
Rated flow	60 l/h per collector
Maximum permitted operating pressure	6 bar
Maximum permitted test pressure	10 bar
Permissible pressure/suction loads	2.4 kN/m ²
Max. operating temperature	130 °C
Climate class	A (very sunny)
Impact resistance according to DIN EN 9806:2018	1.4 m (steel ball, 33 mm)
Free air flow on the back of the collector	≥ 70 mm
Connections	Plug-in connection, 22 mm
Pipe diameter in the meander	10 x 0.4 mm

10.2 Connection Dimensions

Axial dimensions of the connections

For more information on the position of the connectors, see ➔ *section "Hydraulics", page 13.*

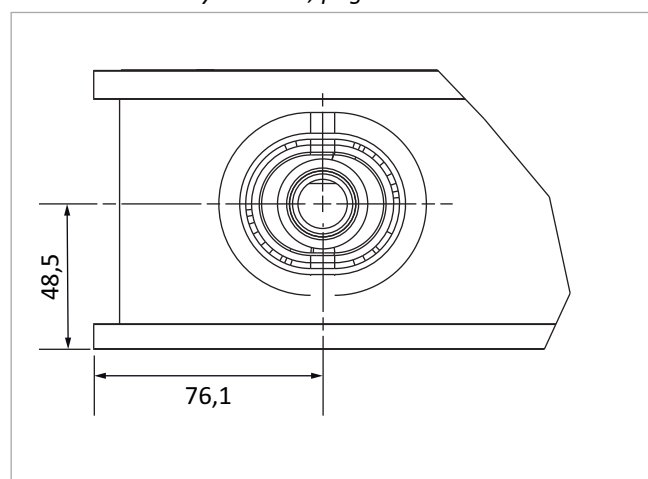


Fig. 52: Connection dimensions SolvisCala C-254-EC

11 Appendix

11.1 Snow and Wind Load Zones

For the structural design of the support structure, it is necessary to know and observe the additional snow and wind load in your region. These loads can be determined using the information from snow and wind load zones. This is the only way to ensure safe installation of the solar system.

The illustrated map provides an overview of the distribution of snow and wind load zones.

Contact the local authorities for the classifications of the standard snow load for the region.

i Contact Solvis if the standard snow load at the installation location is greater than the specifications in EN 1991 according to the local authorities responsible.

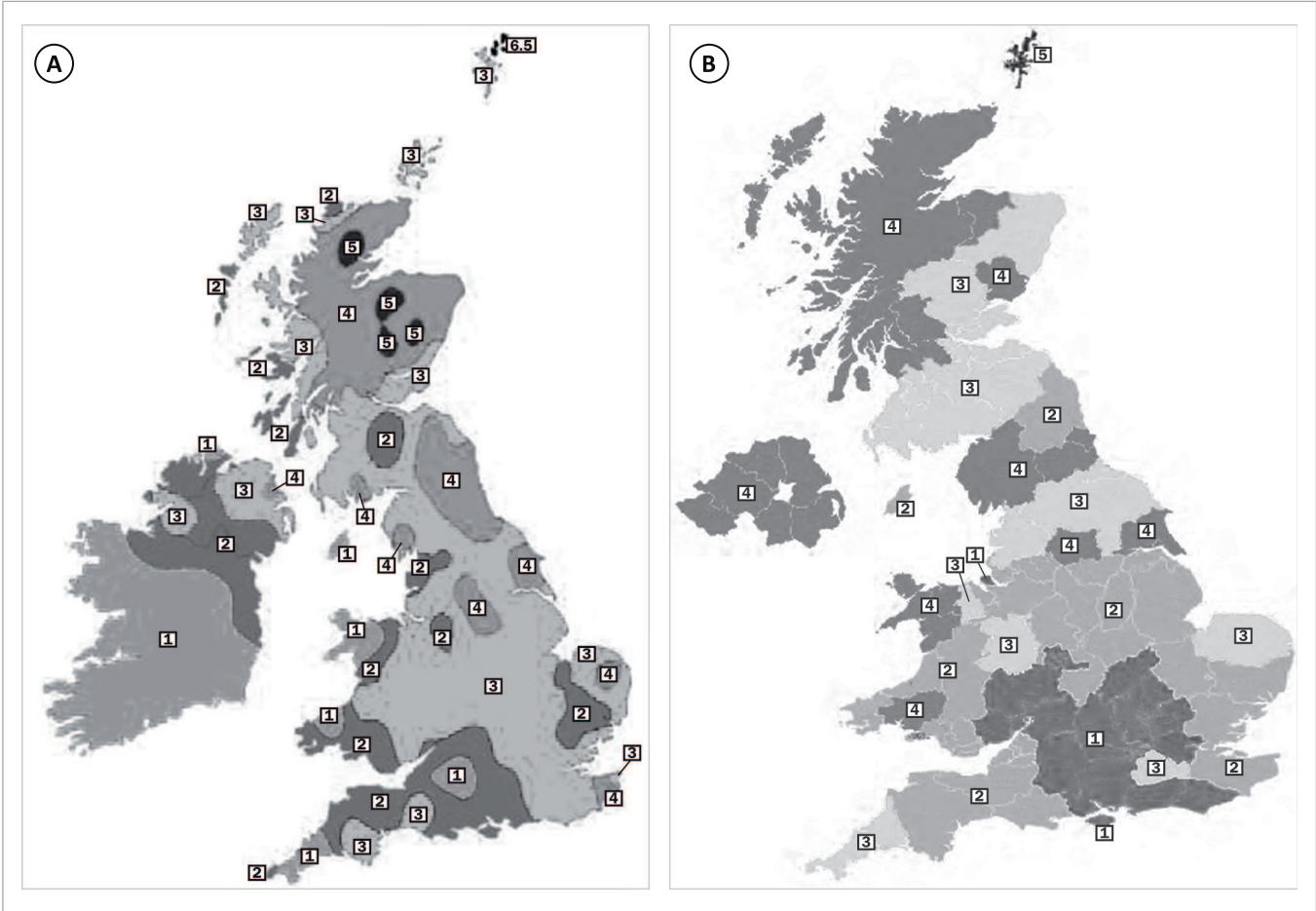


Fig. 53: Distribution of snow and wind load zones in Great Britain

A Snow load zones

B Wind load zones

11.2 Product Fiche



Product fiche collector

Scheda di prodotto di / Ficha del producto de / Ficha de produto de / Fiche de produit de / Productkaart voor de collector

Solvis GmbH
Grotrian-Steinweg-Str. 12
38112 Braunschweig - Germany

Information according to regulation / Informazioni secondo la normativa / Información según reglamento / Informação de acordo com regulamento / Information conforme à la règlement / Informatie volgens verordening:

→ installation instructions / istruzioni per il montaggio / instrucciones de montaje / instruções de montagem / instructions de montage / montage-instructies

Information in accordance with Annex IV

Informazioni in conformità all'Allegato IV / Información de acuerdo con el Anexo IV / Informações em conformidade com o anexo IV / Informations conformément à l'annexe IV / Informatie overeenkomstig bijlage IV

1	2	3									
		SolvisCala			SolvisLuna	SolvisFera					
		C-254-C	C-254-EC	C-254-E	LU-304	F-554-D	F-654-D	F-804-D	F-553-I-AR	F-653-I-AR	F-803-I-AR
4	$A_{sol(g)}$ [m²]	2,56	2,53	2,53	2,87	5,61	7,01	8,40	5,61	7,01	8,40
5	η_{col} [%]	60	57	58	54	62	62	62	63	63	63
6	η_o [%]	79,0	74	74,8	57,7	77	77	77	77,6	77,6	77,6
7	a_1 [W/(m²K)]	3,87	3,76	3,28	0,67	3,13	3,13	3,13	3,05	3,05	3,05
8	a_2 [W/(m²K²)]	0,018	0,009	0,021	0,004	0,014	0,014	0,014	0,016	0,016	0,016
9	IAM [-]	0,92	0,92	0,94	1,00	0,93	0,93	0,93	0,94	0,94	0,94

For collector gross area / Per l'area lorda del collettore / Para área bruta del colector / Para área Bruta do Coletor / Pour la surface brute du collecteur / Voor collector bruto oppervlakte

- Collector values / Valori da collezione / Valores de colector / Valores do coletor / Valeurs du collecteur / Collectorwaarden
- Abbreviation / Abbreviazione / Abreviatura / Abreviatura / Abréviation / Afkorting
- Solar collector / Collettore solare / Colector solar / Coletor solar / Capteur solaire / Zonnecollector
- Reference surface / Superficie di riferimento / Superficie de referencia / Superfície de referência / Surface de référence / Referentieoppervlak
 $A_{sol(ap)}, A_{sol(g)}$ [m²]
- Collector efficiency / Efficienza del collettore / Eficiência do coletor / Rendement du capteur / Collectorefficiëntie η_{col} [%]
- Optical efficiency / Efficienza ottica / Eficiencia óptica / Efficacité optique / Optische efficiëntie η_o [%]
- Linear heat transfer coefficient / Coefficiente di trasmissione termica lineare / Coeficiente de transferencia de calor lineal / Coeficiente de transferência de calor linear / Coefficient de transfert de chaleur linéaire / Lineaire warmteoverdrachtscoëfficiënt a_1 [W/(m²K)]
- Square heat transfer coefficient / Coefficiente di trasmissione termica quadrato / Coeficiente de transferencia de calor cuadrado / Coeficiente de transferência de calor quadrado / Coefficient de transfert de chaleur carré / vierkante warmteoverdrachtscoëfficiënt a_2 [W/(m²K²)]
- Incident angle modifier / Modificatore dell'angolo di incidenza / Modificador ángulo de incidencia / Modificador de ângulo de incidência / Agent de modification de l'angle d'incidence / Invalshoek modifier IAM [-]

Fig. 54: Product data sheet

11.3 Statics project sheet for the installation of the collector

Address	Request from:		Construction project:				
	Name				Preparation required by:		
	Street						
	Post code / town						
	Phone						
	Fax/e-mail						
Valid only for Germany! Height above sea level [m]:							
Geographical data	Snow load zone or snow load in [kN/m ²]:	☐ 1	☐ 1a	☐ 2	☐ 2a		
		☐ 3	☐ or snow load in [kN/m ²]:				
	Wind load zone or reference speed [m/s]:	☐ I	☐ II	☐ III	☐ IV		
		☐ or reference speed in [m/s]:					
	Terrain category:	☐ Open sea, flat land	☐ Agricultural area	☐ Suburban area, industrial area	☐ Urban area		
	☐ Mixed profile by the coast	☐ Mixed profile inland					
Building data, geographical data	Installation height* c [m]:			☐ Wall-mounted installation $\alpha = 90^\circ$ $75^\circ > \alpha > 45^\circ$ 		☐ Flat roof mounted installation 	
	Ridge length a [m]:			☐ Lean-to roof 	☐ Gable roof/butterfly roof 		☐ Hipped roof
	Verge length d [m]:						
	Roof slope α in [°]:						
	Installation type						
	☐ In-roof ☐ Roof-mounted, tile ☐ Roof-mounted, plain tiles ☐ Roof-mounted, standing seam ☐ Roof-mounted, corrugated roof ☐ Roof-mounted,						
	* The highest point of the surface to be built on is decisive. For free-standing installations on the ground , please enter 0 metres as the decisive height.						
Notes							

For the accuracy of the information:

(Location, date)

(Name in block letters)

(Signature)

11.4 Solar Keymark certificate

The Solar Keymark certificate and the corresponding data sheet can be viewed at <http://www.dincertco.com>.

11.5 Accessories



All accessories are listed in the → *Solvis price list*.

11.6 Nameplate

Each unit has a product-specific nameplate that indicates the most important parameters. The contents are explained using this example.

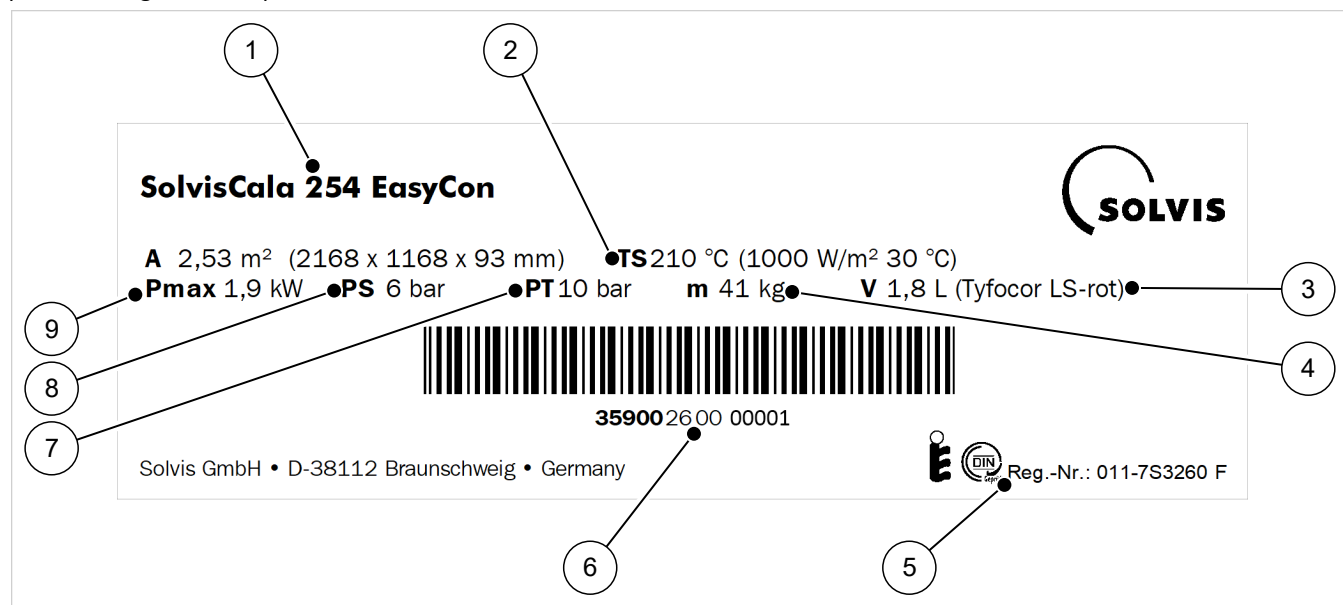


Fig. 55: Type plate sample SolvisCala 254 EasyCon

- 1 Type designation
- 2 Idle temperature
- 3 Amount of solar liquid
- 4 Weight
- 5 Solar Keymark certificate number
- 6 Serial number
- 7 Maximum permitted test pressure
- 8 Maximum permitted operating pressure
- 9 Maximum heat output
- 10 Gross surface area and collector dimensions

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