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# Installation Instructions SOLRIF® XL

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Date: April 27, 2006

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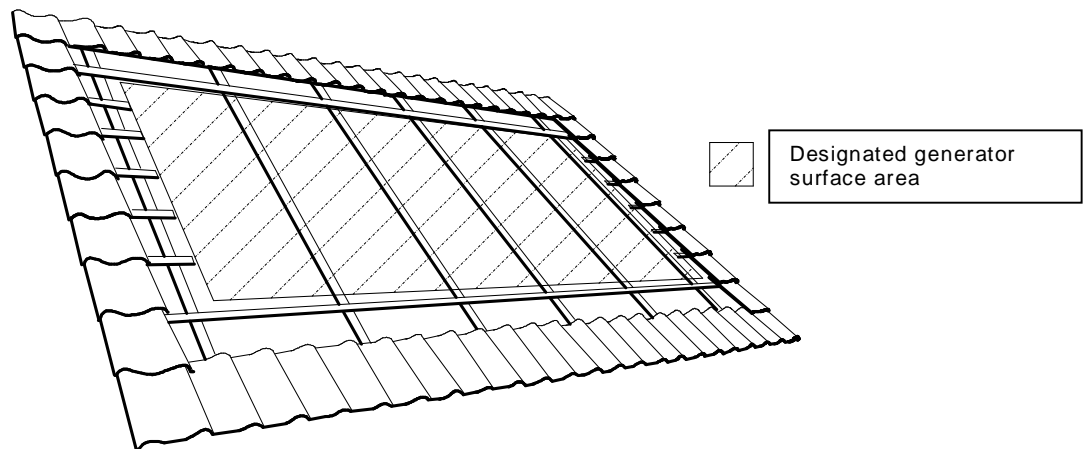
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## 1 Introduction

The Installation Instructions SOLRIF®XL describe the process of in-roof installation of photovoltaic (PV) modules using SOLRIF®XL system frames. The required components, tips on measuring and precautionary safety measures are discussed in the document “SOLRIF®XL: Description of the System”. Direct current (DC) wiring is not discussed in these instructions, for that should only be executed by a professional electrician, unless prefabricated modules with cables and shock-proof plug and socket connections are being installed.

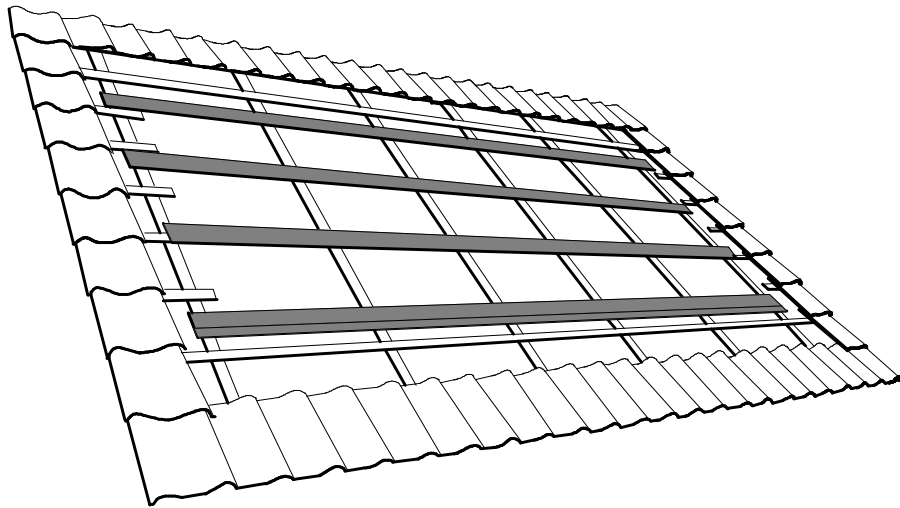
## 2 Preparing the substructure

Remove enough of the existing tiles from the roof so that you have room to spare for the generator. Room to spare means an extra row all the way around the planned generator space, which will allow enough space for laying down the flashings. Rafters, laths and roof deck must be in good condition; if necessary, measures should be taken to put the roof in good repair. Calculating the dimensions of the generator are discussed in “SOLRIF®XL: Description of the System”, section 4.2. The lathing in the designated generator area should be removed.



**Fig. 1: Tiles and lathing should be removed from the designated generator space.**

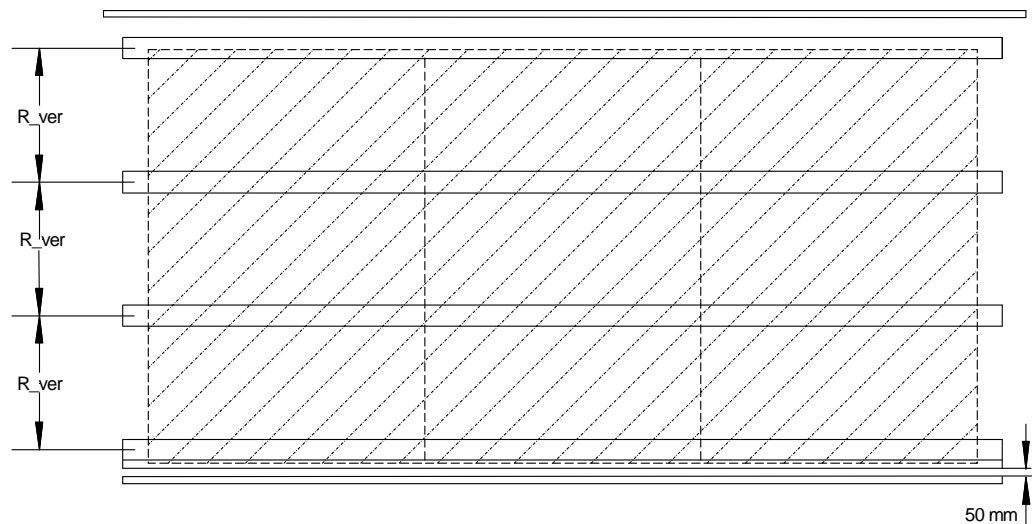
As is the case with a conventional tile roof, with SOLRIF®XL modules laths serve as the substructure. Properly dried softwoods in accordance with DIN 1052 should be used for the laths. The length of the lathing should be at least as long as the generator width including the profiles (see “SOLRIF®XL: System Description”, section 4.2) and should be placed flush against the rafters, eventually using spacers. Because of the weight, the lathing for SOLRIF®XL should always be supported by counter lathing or rafters at both ends.



**Fig. 2: The eaves and SOLRIF®XL module lathing is fastened to the counter lathing or rafters in accordance with the lathing plan.**

The eaves lath is fastened by screws 5 cm above the first single-piece tiling lath located below the generator area. The eaves lath will be needed as a surface for the Wakaflex tape (see Detailed Drawing A, page 7). Care should be taken to ensure horizontal installation. The lath should sit flush against the rafters or the spacers.

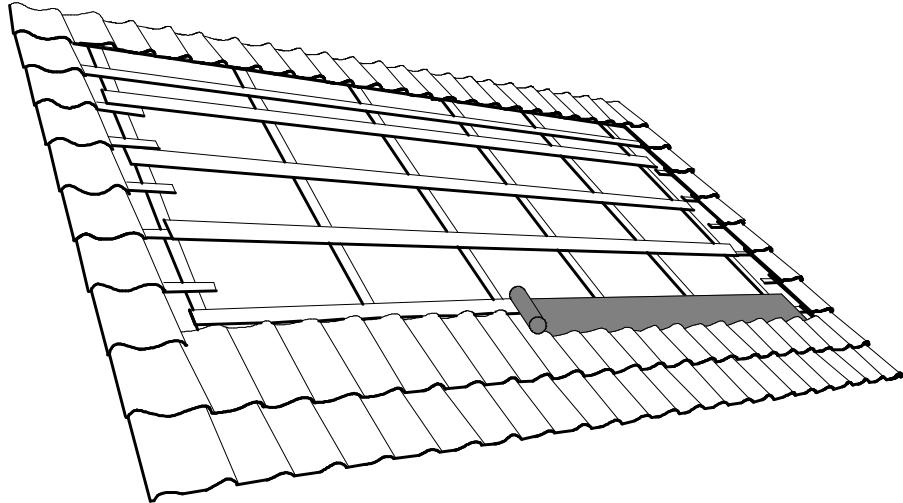
The first SOLRIF®XL module lath is now fastened flush above the eaves lath. The median line of this lath is important to the worker overseeing the installation of the system as a base line. All further laths are placed in reference to this base line, corresponding to the vertical grid, which is discussed in "SOLRIF®XL: Description of the System", section 4.1.



**Plan 1: Lathing plan**

### 3 The lower seam

Before beginning to install the SOLRIF®XL modules, the lower seam should be constructed. The lower row of tiles should first be put back into place. Subsequently the Wakaflex tape is to be applied flush to the top edge of the lowest SOLRIF®XL module lath. During this step, please follow the instructions on working with Wakaflex, to be found on the BRAAS homepage, [www.braas.de](http://www.braas.de).



**Fig. 3:** Wakaflex tape is used at the lower seam.

### 4 Wiring

Before installing the SOLRIF®XL modules, the ends of the cable wires should be positioned on the roof deck, according to the specific plan. For the sake of convenience this wiring is usually provided with plugs and receptacles. Over shorter distances cables should be nailed to the lathing by means of cable clamps. Where several cables are run parallel to each other, it is advisable to install a cable duct between the laths. Cables marked “+” and “-“ should be laid neatly and snugly to avoid looping (inductive over-voltage). The necessity of lightning guards or over-voltage protection should be determined as the case may be.

### 5 Clamps in General

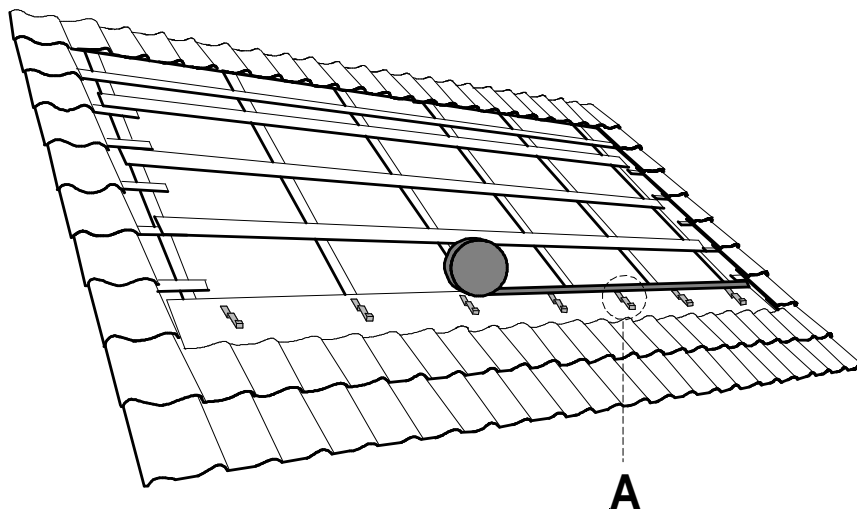
In principle SOLRIF®XL modules are held by means of clamps fastened by screws to the SOLRIF®XL lathing. A SOLRIF®XL module is held at each lower frame corner by a “frame” clamp. Modules located in the middle of the generator field, contrary to modules at either the left or the right side, share a “frame” clamp where their edges meet. An additional “glass” clamp supports the module in the middle of the module and is provided with protective coating to protect the otherwise unprotected edge of the glass.

The positioning of the clamps is determined by the grid plan – see the document “SOLRIF®XL: System Description”, section 4.3.

**Tip:** Ensure that the screws are positioned at least 22.5 mm from the lower and 45 mm from the upper lath edge (DIN 1052-2).

## 6 Initial row of clamps

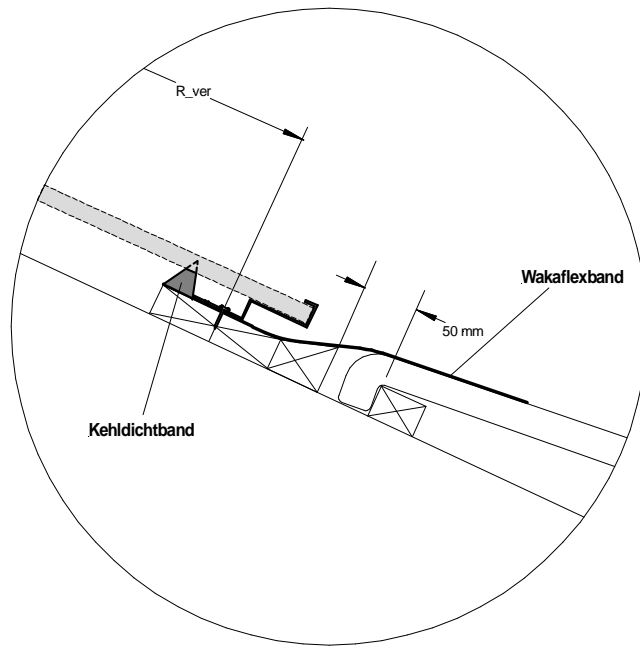
During installation begin with the lower row of “frame” clamps, which are screwed directly through the Wakaflex tape along the longitudinal axis of the lower SOLRIF®XL module lath. The grid uses the clamp’s lower bore as its point of reference. Each clamp will require two 4.5 x 30 mm SPAX-S A2-steel sheet-metal screws.



**Fig. 4:** The first row of clamps is screwed upon the Wakaflex tape. The Sealing tape keeps small animals from the hollows (see Detail Drawing A, page 7).

**Tip:** Mark the longitudinal axis of the module lath on the Wakaflex tape with a chalked string. Then mark the horizontal clamps’ position in accordance with the grid. The clamps are then fixed in their exact position by inserting a screw through the lower bore at the “line cross”. Now the additional “glass” clamps are put into place.

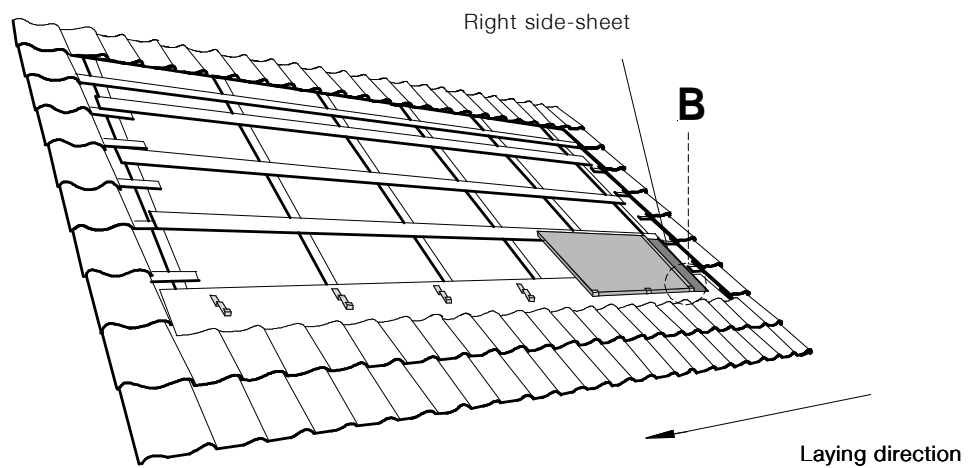
Finally sealing tape is applied flush to the upper edge of the module lath. This will prevent small animals from entering the hollows.



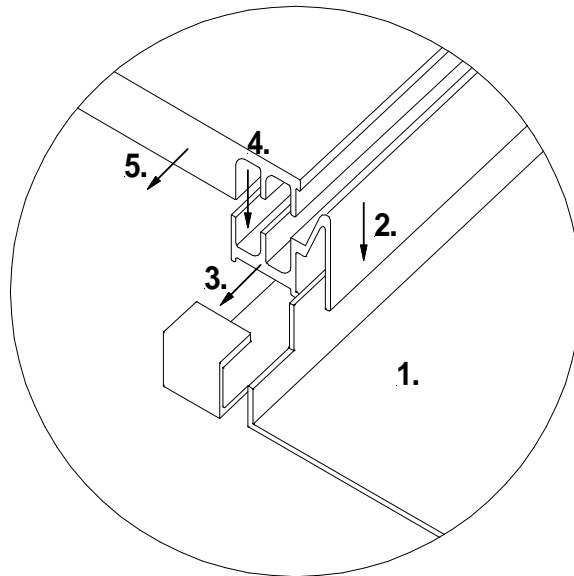
**Detail Drawing A: vertical cross section of the lower sealing area**

## 7 Lower row of modules

Over-lapping determines the order in which the SOLRIF®XL modules are installed, thus each row is laid from right to left. As with roof tiles, the module rows are laid from the bottom up.

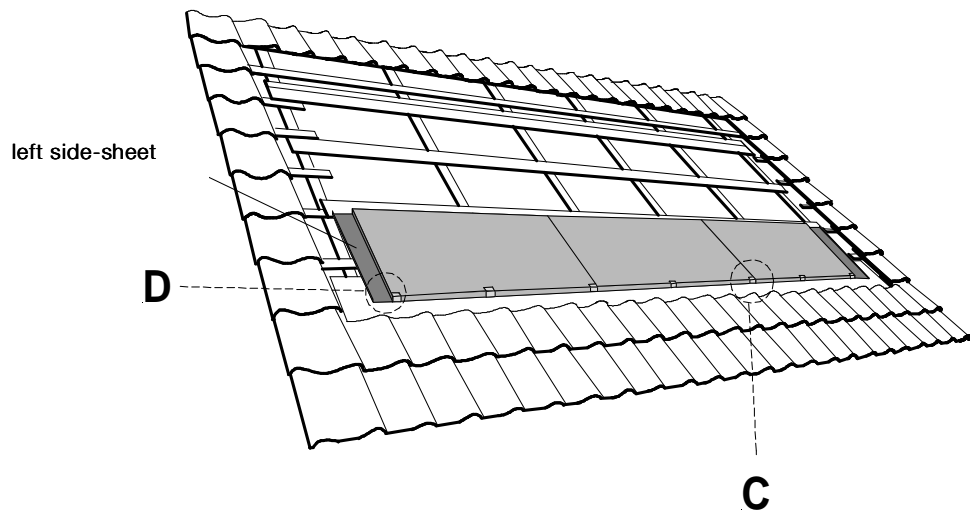


**Fig. 5:** Starting at the right, the first row of modules is laid.

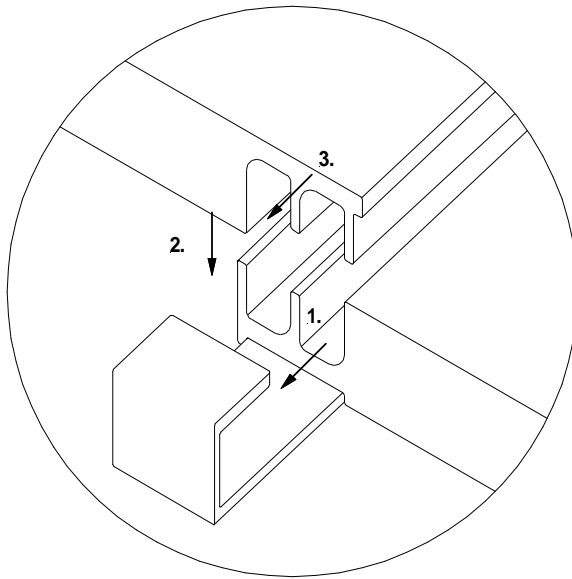


**Detail Drawing B: Sequence from the side-sheet to the first module**

Before the first SOLRIF module can be fitted into the clamp, the right side-sheet must be installed (step 1). Then a right-side joining profile is inserted into the outermost clamp (steps 2 + 3). The first module can now be installed (steps 4 + 5).

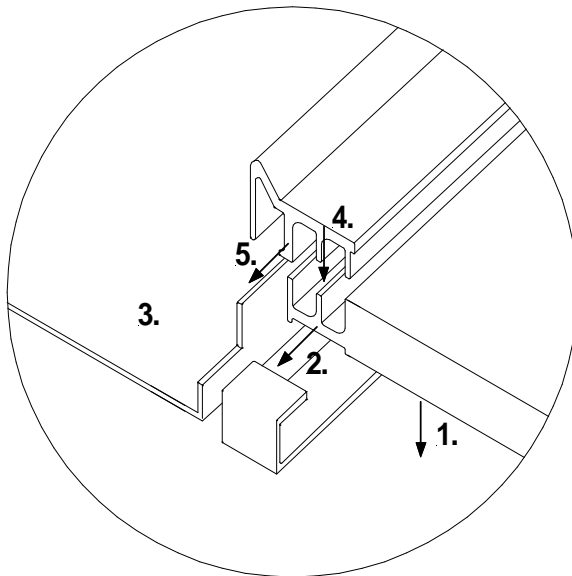


**Fig. 6: The modules of the first row, side-sheets and joining profiles are installed.**



The next SOLRIF®XL modules in the first row are laid following the steps shown in Detail Drawing C. The modules should be wired according to the cord plan before they are laid.

**Detail Drawing C: Sequence for laying the middle modules**



After the last SOLRIF®XL module in the row has been laid, the left side-sheet and the joining profile can be set. (Detail D)

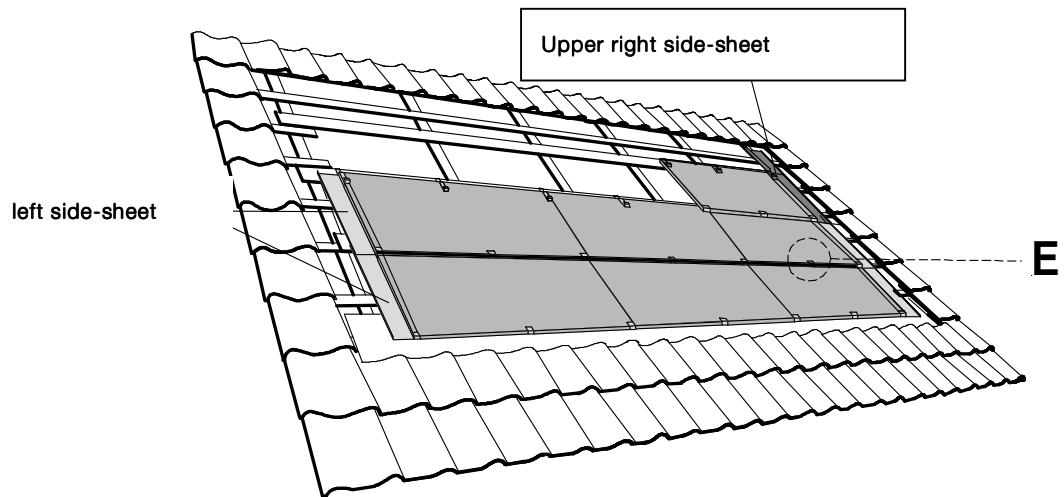
**Detail Drawing D: Sequence on the left-side-sheet**

## 8 From the second to the top row of modules

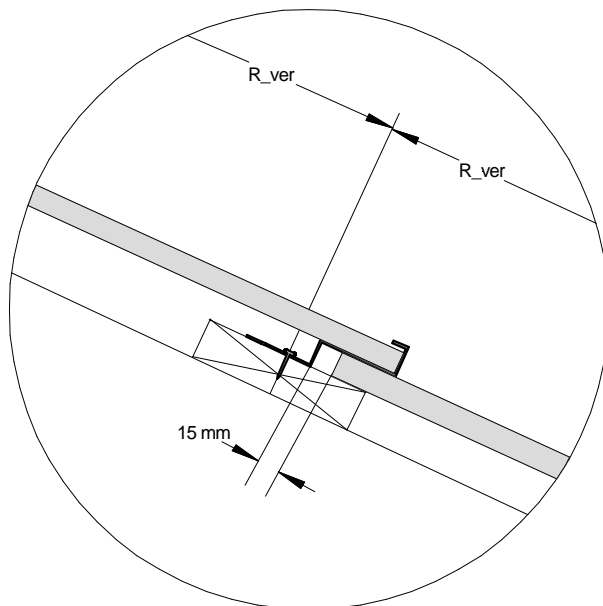
After the first row of SOLRIF®XL modules has been laid complete with the joining profiles, the clamps for the second row can be set. It is possible by using the grid plan to pre-mark the clamp position on the module lathing and precisely to set the clamps in turn.

Usually, however, a different, easier method is used:

The “frame” clamps are positioned by eye plumb, using the clamps in the first row as a guide. The sides of the framing profiles of the lower SOLRIF®XL modules can help in alignment.



**Fig. 7: Laying the next row of modules.**

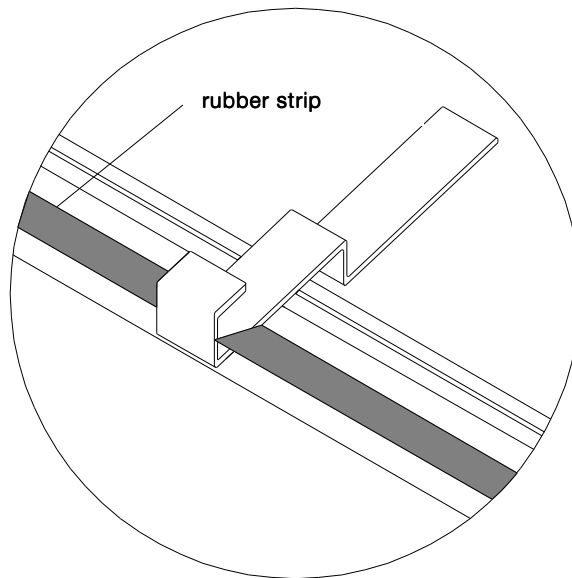


**Detail Drawing E: Overlapping modules**

The clamps are fastened leaving 15 mm space to the previous row of modules. This space will allow the replacement of individual modules within the generator field by a simple slide-and-slip maneuver.

**Tip:** Use a 15 mm spacing wood to place the clamps.

The same procedure is to be used for the “glass” clamps, which again are set at regular intervals.



**Detail Drawing F: Rubber strip**

In order to guard against seeping water a rubber strip is inserted into the upper framing profile. It is advisable to cut the rubber strip at the side with a carpet knife so that the strip can be laid so as to ensure a safeguard against rainwater.

To lay the remaining rows of modules, side-sheets and joining profiles, follow the procedure outlined in section 1.5.

### **Upper side-sheets**

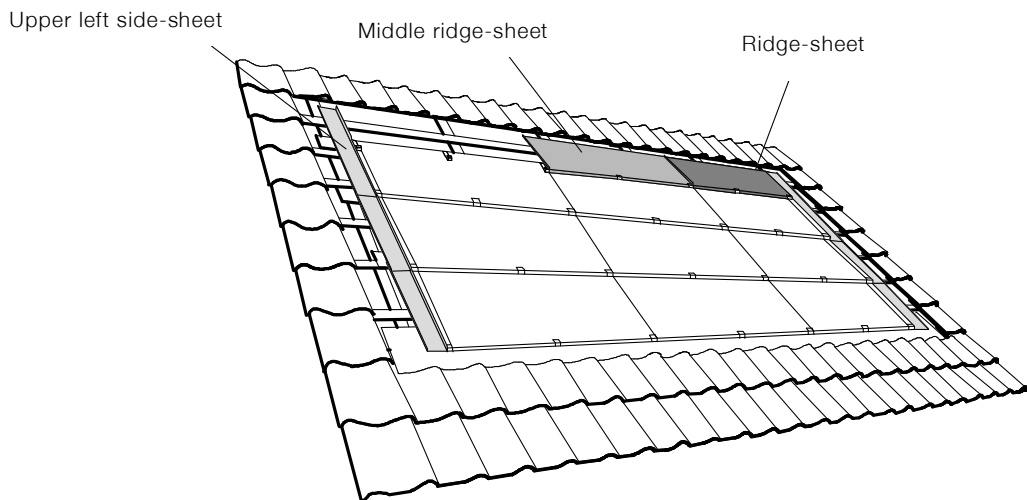
The upper side-sheets are somewhat longer than usual side-sheets in order to allow backing water to run off. The installation procedure is similar to that of normal side profiles.

### **Top Clamps**

The top row of modules are secured on the upper edge by “frame” clamps which later accommodate the flashing. Their placement is determined by the grid plan.

## **9 Top Seam**

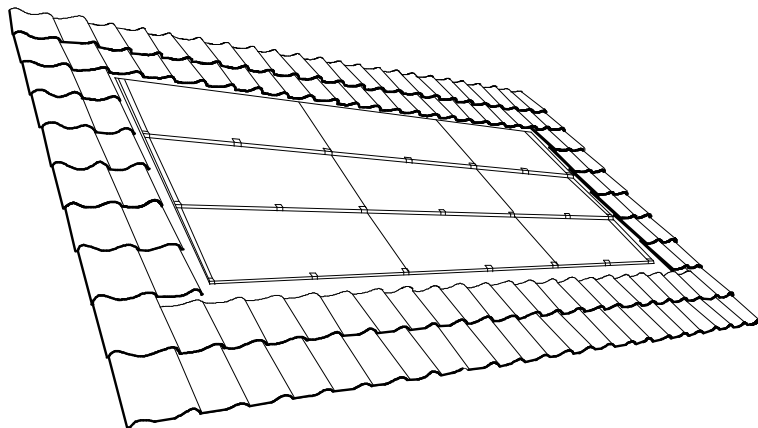
The top seam sheets are set into clamps instead of a further row of modules. This will be the crossover to the roof tiles.



**Fig. 8:** Laying the ridge sheets

Start with the right-hand side ridge sheet, which, because of its special form, fits exactly into the upper right-hand side-sheet. Then the middle ridge sheets are installed, lipped edge against lipped edge.

The left-hand side ridge sheet has been specially formed as well and fits into the upper left-hand side-sheet. The adjacent sheet-lips are joined watertight by means of the edge-safeguard profile.



**Fig. 9:** Laying the roof tiles.

The missing tiles are re-laid at the sides of and above the generator field. If necessary, the tiles may have to be cut in order to provide for a proper integration of the generator into the roof. Professional roofing skills are required for this last step, too.

## 10 Construction Checklist

| Pos. | Article   | Quantity (piece; meter)                             | Supplier           |
|------|---|---|--------------------|
| 1    | Grid plan   | 1   | SOLRIF supplier    |
| 2    | Framed modules                                      | dependent upon Pos. 1                               | SOLRIF supplier    |
| 3    | Clamps, spring steel                                | dependent upon Pos. 1                               | SOLRIF supplier    |
| 4    | 4.5 x 30 mm SPAX-S sheet-metal A2-steel screws      | 2 per clamp   | Installer          |
| 5    | SOLRIF lathing 30 x 100 mm, 30 x 50 mm doubled      | Area width x (number of module rows + 1)            | Installer          |
| 6    | Eaves lath 40 x 45 or 30 mm                         | 1 x width of area                                   | Installer          |
| 7    | SPAX-S with countersunk heads for lathing 6 x 90 mm | dependent upon area size and grid rafters and laths | Installer          |
| 8    | Sealing tape 30 x 40 mm                             | 1 x width of area                                   | Installer          |
| 9    | Joining profile, aluminium                          | 1 pair per module row                               | SOLRIF supplier    |
| 10   | Side-sheets   | 1 pair per module row - 1                           | Local roof plumber |
| 11   | Side-sheets, top                                    | 1 pair  | Local roof plumber |
| 12   | Upper side-sheets / middle                          | No. of module columns - 2                           | Local roof plumber |
| 13   | Upper side-sheets / right                           | 1   | Local roof plumber |
| 14   | Upper side-sheets / left                            | 1   | Local roof plumber |
| 15   | Wakaflex tape                                       | 1 x width of area                                   | Installer          |
| 16   | Cable ties  | due to generator size                               | Installer          |
| 17   | Measuring tape and meter stick                      | 1 a piece   | Installer          |
| 18   | Carpenter's pencil                                  | 2   | Installer          |
| 19   | Handsaw and jigsaw                                  | 1 a piece   | Installer          |
| 20   | Screwdriver (bit tip holder 2)                      | 1   | Installer          |
| 21   | Knife   | 1   | Installer          |
| 22   | Chalked string                                      | 1   | Installer          |
| 23   | Metal shears, sheet-metal pliers                    | 1 a piece   | Installer          |

## 11 Contact

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