

# Solar energy systems

## Solrif® range of application relating to water-tightness

### 1. Summary

This document outlines the range of application in which Solrif® can be deployed at various roof pitches and minimum-level requirements for roof sub-structures and underlays. In many countries it has become common practice to install an underlay below the roof covering as a secondary barrier to drain condensation moisture but also against wind driven rain and snow. However, standards vary considerably. The “reference roof pitch” according to Germany’s roofers association ZVDH has been defined at the technical University of Berlin to 22° (prEN 15601).

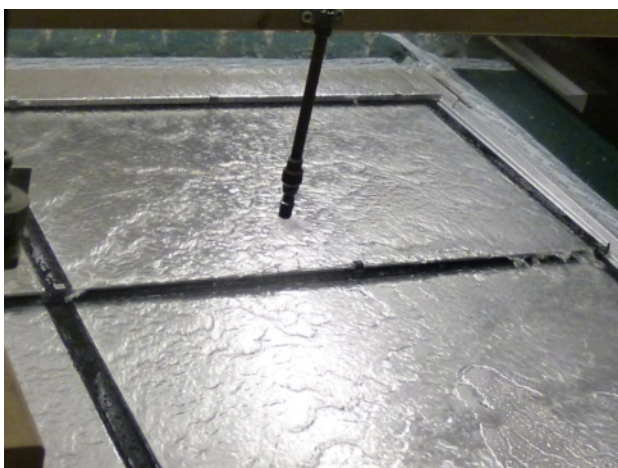
Performance parameters and requirements have been established based on:

- Driving rain tests at French scientific and technical construction institute (CSTB, Centre technique et scientifique du bâtiment, France)
- Driving rain tests according to prEN 15601 at Technical University Berlin, Germany, certificate no. 130208
- Requirements by German Roofers Association (ZVDH)
- Requirements by Swiss Society of Engineers and Architects (SIA)

### 2. Requirements based on application

For Solrif®, the following requirements have been determined regarding water-tightness:

Roof pitch	Description
> 10°	Minimum roof pitch for using Solrif®
10° - 22°	Water-tight roof substructure required
<b>22°</b>	<b>“reference roof pitch” according to ZVDH (German roofer’s association)</b>
> 22°	Rain-proof roof substructure required
< 32°	Underlay must be implemented to drain into the gutter
Roof renovation	
> 32°	No need to upgrade the old roof substructure (for using Solrif®)
< 32°	The old roof substructure may need to be upgraded to be rain-proof



Tests according to prEN 15601 at TU Berlin



Tests at CSTB facility Jules Verne in Nantes

### 3. Guidelines

#### 3.1. Rain-proof roof substructure

A rain-proof sub-roof requires an impermeable underlay. The underlay is fixed to the sub-roof in the upper third of the horizontal overlaps and all overlaps are sealed watertight. Counter-battens, however, do not need



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Information sheet of watertightness

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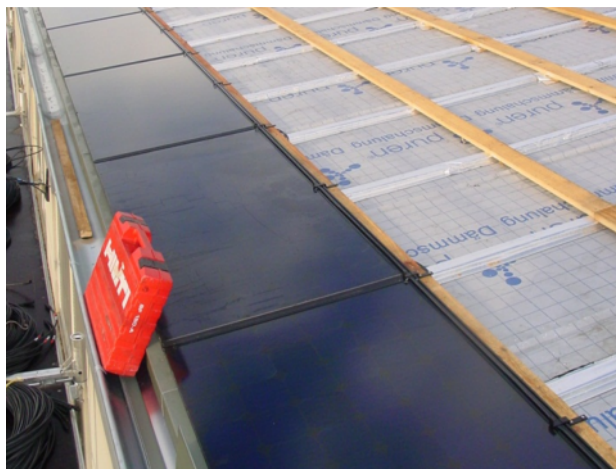
to be covered. Any penetrations such as for connections must be implemented in a rain-proof way. In ventilated constructions, ingress of drifting snow and rain through ventilation openings cannot be avoided. Additionally, a rain-proof sub-roof functions as a barrier against the drip of condensation moisture.

### 3.2. Water-tight roof substructure

A water-tight roof substructure requires the same impermeable underlay as the rain-proof sub-roof (see above), but in addition requires the impermeable underlay to also cover the counter-battens to ensure that the slate battens penetrate the underlay at relatively elevated points. Thicker counter battens should be used at sites where a lot of driven rain and drifting snow should be expected. Wood should not be fully sealed behind impermeable sheeting, as any moisture inside may lead to rot. Alternatively, rot-resistant materials may be used for the counter-battens. Any penetrations such as ducts must be implemented in a water-tight way. Additionally, a water-tight sub-roof is appropriate as a barrier against dripping condensation moisture.



Rain-proof roof substructure



Water-tight roof substructure

### 3.3. High load requirements

Locations with extraordinary climatic conditions, especially high exposure to wind and rain and roofs more than 8 meters wide (rafter length) require additional weather-proofing measures like to use a lock bar from moisture-resistant materials or increase the counter batten.

### 3.4. France

Since the different requirements under roofs are not common in France and in the definition of ATEC (Avis Technique: 21/12-22) refer to tests without under roof, a limit of 15 ° was determined by the CSTB. With the above measures Solrif® can be used down to 10 °.

## 4. Technical support

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