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**Classification report for
roofs/roof coverings
exposed to external fire
in accordance with BS
EN 13501-5: 2005**

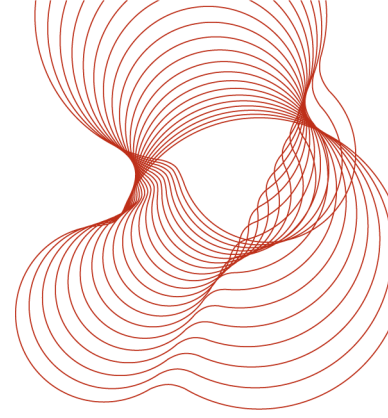
Prepared for:
Joule Energy Solutions Ltd.
Kylemore Park West
Ballyfermot
Dublin 10
Eire

17th November 2010

Classification report no. 266913



0578



Prepared on behalf of BRE Global by

Name S M Warbus

Position Senior Consultant

Signature

Approved on behalf of BRE Global by

Name S J Howard

Position Principal Consultant

Date 17/11/10

Signature

BRE Global
Bucknalls Lane
Watford
Herts
WD25 9XX
T + 44 (0) 1923 664100
F + 44 (0) 1923 664994
E enquiries@breglobal.com
www.breglobal.com

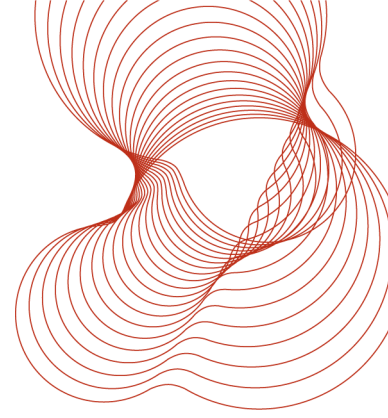
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CLASSIFICATION REPORT FOR ROOFS/ROOF COVERINGS EXPOSED TO EXTERNAL FIRE

Sponsor: Joule Energy Solutions Ltd. Kylemore Park West, Ballyfermot, Dublin 10, Eire

Prepared by: BRE Global, BRE, Bucknalls Lane, Garston, Watford, WD25 9XX, England

Notified Body No: 1576

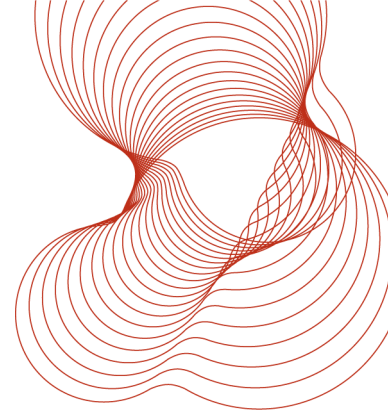
Product name: Joule High Performance VisSolis In Roof Solar System with slate flashing kit

Classification report No.: 266913

Issue number: 1

Date of issue: 17th November 2010

This classification report consists of ten pages and may only be used or reproduced in its entirety



1 Introduction

This classification report defines the classification assigned to Joule High Performance VisSolis In Roof Solar System with slate flashing kit in accordance with the procedures given in EN 13501-5:2005.

2 Product description

The roof / roof covering comprises: Joule High Performance VisSolis In Roof Solar System with slate flashing kit

Product description as provided by the client is given in Annex 1.

3 Test reports/extended application reports & test results in support of classification

<i>Name of Laboratory</i>	<i>Name of sponsor</i>	<i>Test report ref. no.</i>	<i>Test method</i>
BRE Global	Joule Energy Solutions Ltd	266912	ENV 1187:2002 Test 4

4 Test results

Test conditions:

Test pitch: Sloping
 Deck: As product description, Section 2
 Supporting structure As product description, Section 2

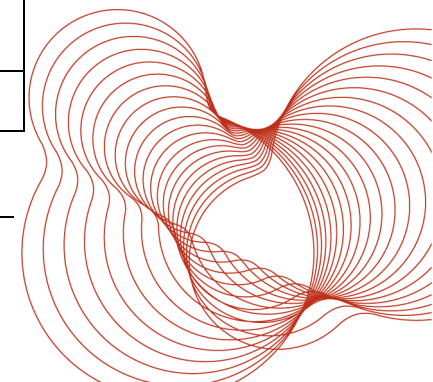
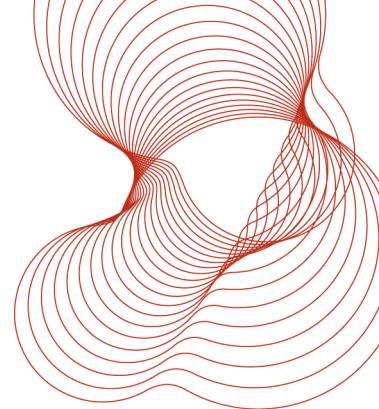
Preliminary test (stage 1)

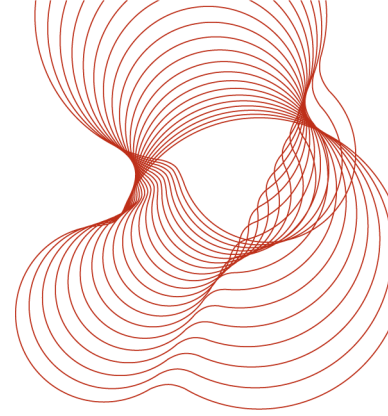
Parameter	Criteria				Test result	Compliance			
	Class B _{ROOF(t4)}	Class C _{ROOF(t4)}	Class D _{ROOF(t4)}	Class E _{ROOF(t4)}		Class B _{ROOF(t4)}	Class C _{ROOF(t4)}	Class D _{ROOF(t4)}	Class E _{ROOF(t4)}
Burn time	< 5 min	< 5 min	< 5 min	≥5 min	0 sec	Y	-	-	-
Flame spread distance	< 0,38m	< 0,38m	< 0,38m	No limit	None	Y	-	-	-
Penetration	None	None	None	None	None	Y	-	-	-

Penetration test (stage 2)

Parameter	Criteria				Test results				Compliance			
	Class B _{ROOF(t4)}	Class C _{ROOF(t4)}	Class D _{ROOF(t4)}	Class E _{ROOF(t4)}	Specimen 1	Specimen 2	Specimen 3	Mean*	Class B _{ROOF(t4)}	Class C _{ROOF(t4)}	Class D _{ROOF(t4)}	Class E _{ROOF(t4)}
Penetration time	≥ 60 min	< 60 min > 30 min	≤30 min	≤ 30 min	60 min	60 min	60 min	60 min	Y	-	-	-

* If one or two of the specimens have not failed at one hour, a time of 60 min shall be used in calculating the mean time of penetration





5 Classification and field of application

5.1 Reference of classification

This classification has been carried out in accordance with Table 1 of EN 13501-5:2005

5.2 Classification

The roof / roof covering Joule High Performance VisSolis In Roof Solar System with slate flashing kit in relation to its external fire performance is classified:

B_{ROOF}(t4)

5.3 Field of application

This classification is valid for the following conditions:

Range of pitches

Pitches > 10°

Deck and supporting structure

The classification is valid only for the deck and supporting structure tested.

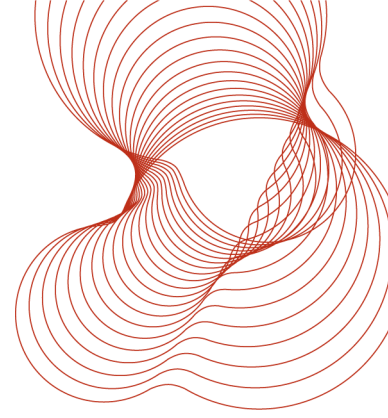
6 Limitations

This classification document does not represent type approval or certification of the product.

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons, it is recommended that the relevance of test and classification reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test or classification to ensure that they are consistent with current practices, and if required may endorse the report.

7 Reference

BS EN 13501-5:2005 incorporating corrigendum no.1, British Standards Institution, London.



Annex 1



Installation instructions

Tools required:



Power drill with screwdriver bit



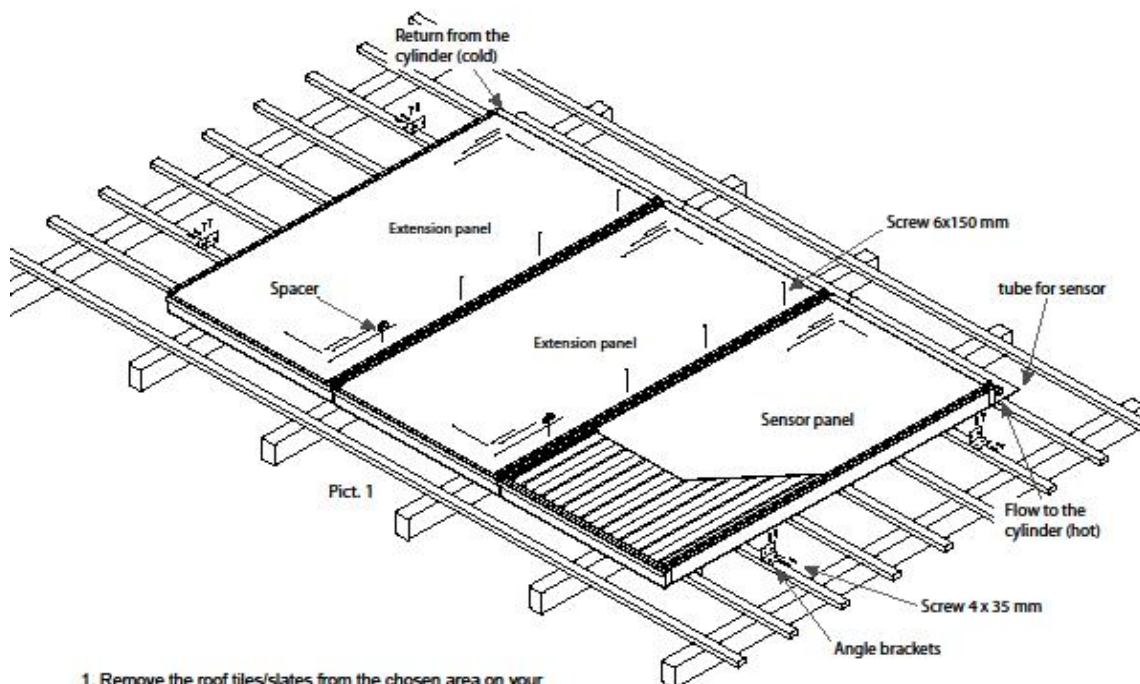
Rubber mallet



Tape measure



27 mm and 38 mm spanners

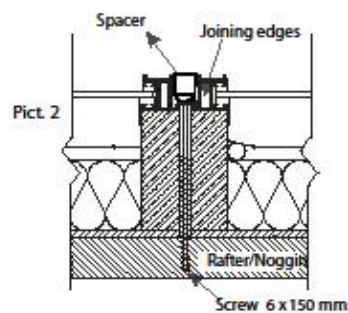


1. Remove the roof tiles/slates from the chosen area on your South facing roof where the panel/s will be placed. (Allow 1 m each side of the panels). Please note, that the upper part of the flashing should be at least 2 tile rows below the ridge!

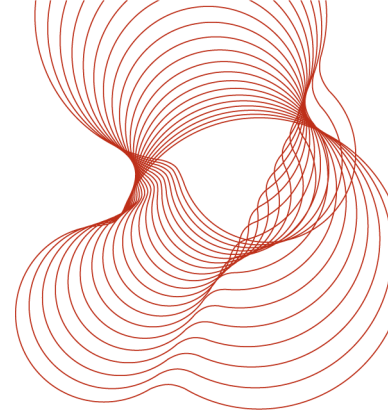
2. There are straps to carry on the upper and under side of the panel. Never carry the panel by the connecting sockets!

3. First install the sensor panel on the right hand side of the array (this panel is marked with a sticker at the top right corner). Place the panels on the cleared part of the roof. On the back of each panel is a lath which hooks over a roofing batten. This prevents the panel from sliding down the roof until it is fixed.

4. Additional panels are placed on the roof. Slide them from the left side to the next panel until the joining edges interlink. (Pict. 2)



Page 1



5. The hydraulic connection is made by connecting the unions between panels. Note! Care should be taken to avoid the connecting pipes rotating, which could damage the absorber in the panel!

6. Due to the internal design, the panels are connected in series. A variety of non-standard options are available for the flow and return connections.

Note! The panel on the right hand side is the hottest this is the flow to the cylinder. The panel on the left side is the return from the cylinder.

7. The panels should now be checked for leaks. Test to at least 12 bar with water/antifreeze. Every connection must be checked over a period of at least 20 minutes. Note! It is not possible to empty the panels. Always check with water/antifreeze mixture.

8. Fixing between panels is by means of 6x150 mm screws through the elongated holes in the aluminium profile to the roof rafters/noggins. Pict. 1+2.

Note! To get the right distance between the panels it is necessary to use the black spacers! Pict. 1+2+7



Pict 7

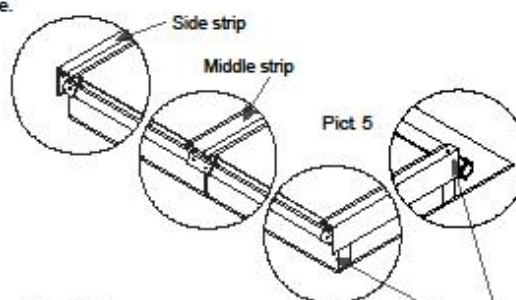
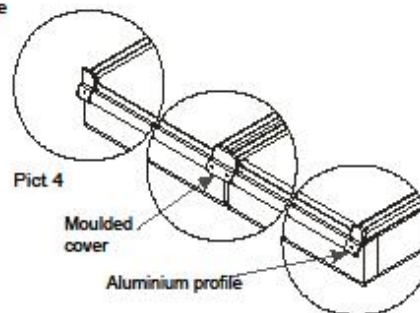
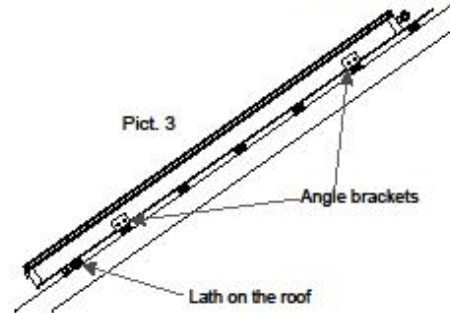
9. The outside panels are fixed on their edges to the roof rafters/noggins with the angle brackets. Pict. 1+3

10. The moulded covers are fitted with screws to the aluminium profile at the bottom of the panels to cover the gaps between the panels. Pict. 4

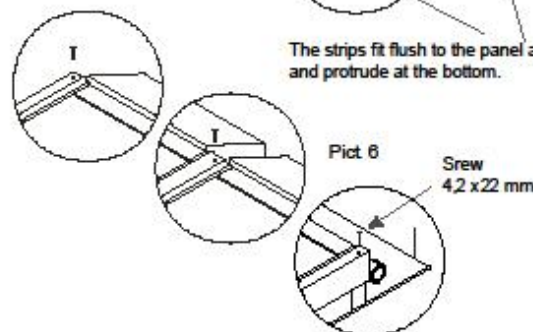
11. The middle aluminium cover strips can now be fitted. Pict. 5
Note! The countersunk hole in the strips must be at the top! Tap with the rubber mallet until the cover strip clicks into place. The two side strips are mounted after fitting the flashing!

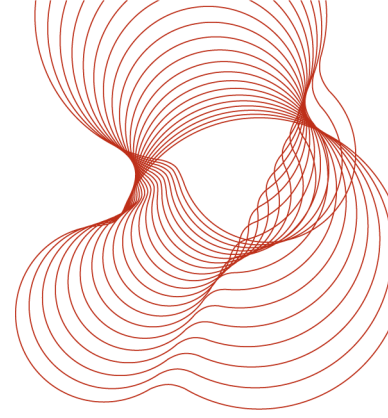
12. Fix the cover strips with the screws to the panel. Pict. 6

13. The panel sensor for the solar control (sensor with red cable) is inserted into the tube which is situated on the right hand panel in the marked position.



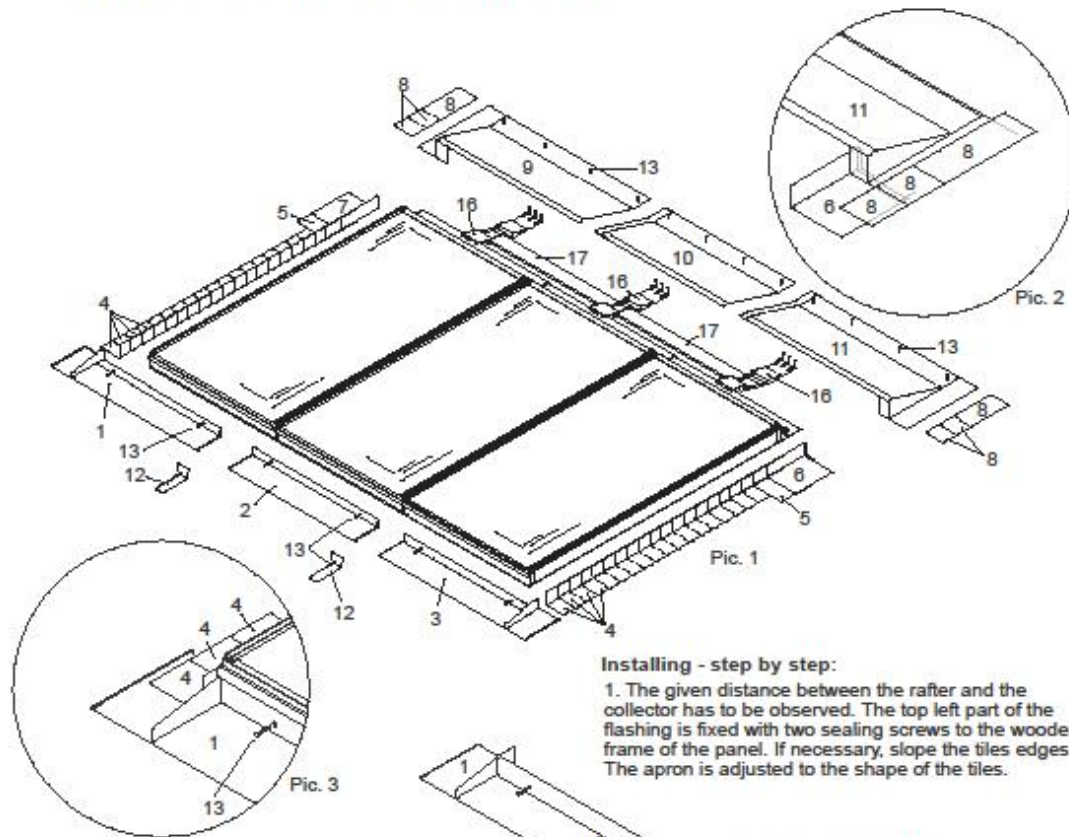
The strips fit flush to the panel at the top and protrude at the bottom.





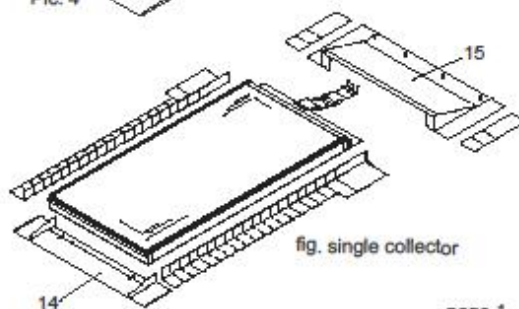
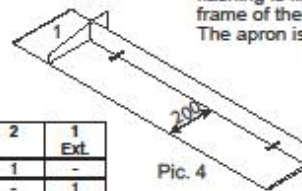
Installation instructions flashing for slates

The flashing is a weatherproof connection between the roof tiles and the solar panels. It is made of powder coated aluminium sheet. The flashing is easy to mount with the pre-formed parts. It is possible to use the flashing with an inclination of more than 23° from the horizontal.

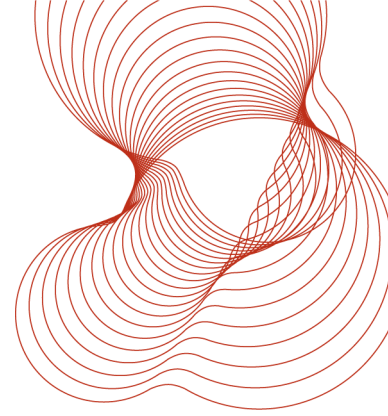


Installing - step by step:

1. The given distance between the rafter and the collector has to be observed. The top left part of the flashing is fixed with two sealing screws to the wooden frame of the panel. If necessary, slope the tiles edges. The apron is adjusted to the shape of the tiles.



Poa	Designation	1	2	1 Ext.
1	Bottom left sheet	-	1	-
2	Bottom middle sheet	-	-	1
3	Bottom right sheet	-	1	-
4	Small side sheet	36	36	-
5	Large side sheet	2	2	-
6	Right hand gutter upper section	1	1	-
7	Left hand gutter upper section	1	1	-
8	Supporting sheet	6	6	-
9	Top left sheet	-	1	-
10	Top middle sheet	-	-	1
11	Top right sheet	-	1	-
12	Connection sieve	-	1	1
13	Screw with washer 4,5x25mm	6	13	7
14	Single collector bottom sheet	1	-	-
15	Single collector top sheet	1	-	-
16	Supporting sheet	1	2	1
17	Wooden supporting board	-	1	1



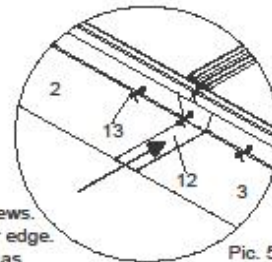
2. (This paragraph applies only if you have more than two panels)
Fit the top middle sheet to the panel with 2 screws.

ATTENTION! The top middle sheet is the same width as the panel. The sheet must fit flush to the panel at both edges. Between any two front parts there must be a gap of about 8 mm. This gap is necessary to compensate for the expansion.

Note that the top middle sheets have to be adjusted horizontally.

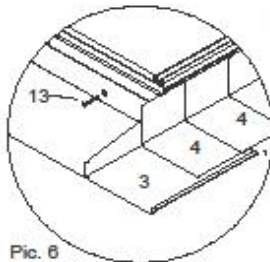
3. Slide the connection sleeve[s] onto the top sheets where they abut to cover the expansion gap[s] screwing them to the lower edge of the panel. (Pic. 5)

4. Fix all the top middle sheets and the connection sleeve[s] in this way.



Pic. 5

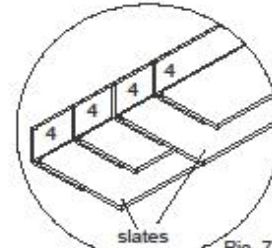
5. Fix the top right sheet to the panel with 2 sealing screws. It's necessary to abut the top right sheet upon the outer edge. (Pic. 6) Slide the connection sleeve[s] in the same way as before.



Pic. 6

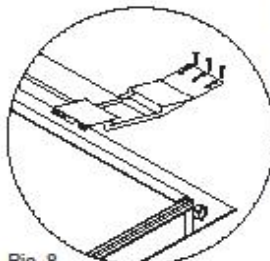
6. Fix the small side sheets starting from the bottom. It is necessary to cover the roof with the slate at the same time. Fit one side sheet under each slate. (Pic. 7) It is necessary to fix the different side sheets with the top of the panel. (Pic. 1)

First of all install the wide side sheet (5) over the small side sheet. Continue with the bottom right and left part (6) (7). It is necessary that the upper side of the panel is fixed with the parts within 2 or 3mm overlap; minimum - it should be flushed.



Pic. 7

7. The supporting sheet (16) has to be hooked in at the upper collector profile and fixed on the rafter behind using the screw. The supporting sheets are always installed in the central of the collector. You need one supporting sheet for every collector. If necessary install an additional rafter. The wooden supporting board is hooked in the supporting sheet (17). This board serves as base for the top sheets of the flashing. (Pic. 8)

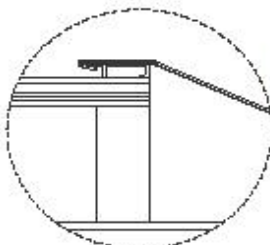


Pic. 8

8. Pull the left bottom sheet (9) over the left side sheet (7). Be careful, the steel sheet upstand of the side sheet should be covered by the bottom sheet! Slide the left hand top sheet up to engage the lip on the aluminium profile with the lip on the panel. The left and right top sheets are fixed to the laths by 2 brackets, 2-3 cm from their edges.

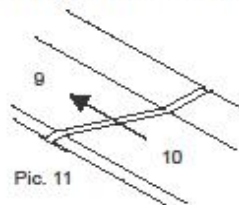
Fix and integrate the supporting sheet (8) with the roof slates in the same way as the side parts before (Pic. 2) (Pic. 7).

Take care not to deform the aluminium flashings as this may allow water to penetrate!

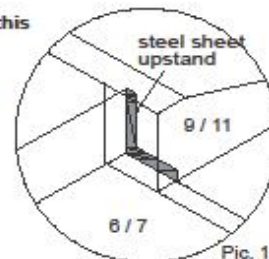


Pic. 9

9. Pull in the middle bottom sheet into the slot of the left bottom sheet. Fix it with 4 screws on the end of the part.

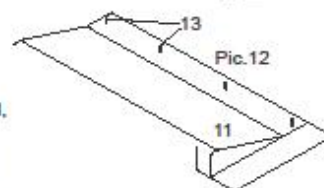


Pic. 11



Pic. 10

10. Pull the right bottom sheet (11) over the right side sheet (8). Also be careful, the steel sheet up stand of the side sheet should be covered by the bottom sheet! (Pic. 10) Stick the bottom sheet together with the profile of the collector and pull it over (Pic. 9) On the end of the part fix it with 4 screws. (Pic. 12) Above fix the supporting sheet (8) in the same way as before (Pic. 2) (Pic. 7).



page 2

=====REPORT ENDS=====