

Customer:

Viridian Solar Limited  
Low Farm  
Brook Lane, Cambridgeshire  
UK-SG8 5NT Bassingbourn

Tel. +44 1763 853 007  
Fax: +44 871 872 8276

# Addendum to Test Report No. C1020QPEN

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## 1 Purpose of the Addendum

This addendum summarizes the results of a extended mechanical load test. The intention of the test is to find the maximum wind and snow loads that are acceptable for the collector with the SPF test number C1020. The extended mechanical load test is carried out according to the procedure given in EN12975, but with increasing loads up to a failure of the collector or the test installation. The collector is installed according to the installer manual of the manufacturer

## 2 Test procedure and results

### Stage 1

Evenly distributed pneumatic suction cups are used to apply the positive and negative forces. Number of suction cups is 18



Picture 1

18 suction cups evenly distributed over the collector surface. Positive and negative forces applied up to 2500 Pa.



Picture 2

At loads exceeding 2000 Pa a certain deformation of the hooks and the screws used for the installation was observed. The battens used to simulate the roof split apart.



Picture 3  
One of the screws used to fix the collector.

**Conclusion from stage 1:**

No structural problems observed for the collector and its casing for loads up to 2500 Pa. The screws that were delivered with the collector are not strong enough and are too short. Furthermore it is important to use three screws per hook and not only two as shown in the installer manual. It is important to use sufficiently strong battens.

**Stage 2**

To apply higher loads the number of suction cups is increased to 24. The screws used to fix the collector were replaced by stronger screws. The battens were reinforced.



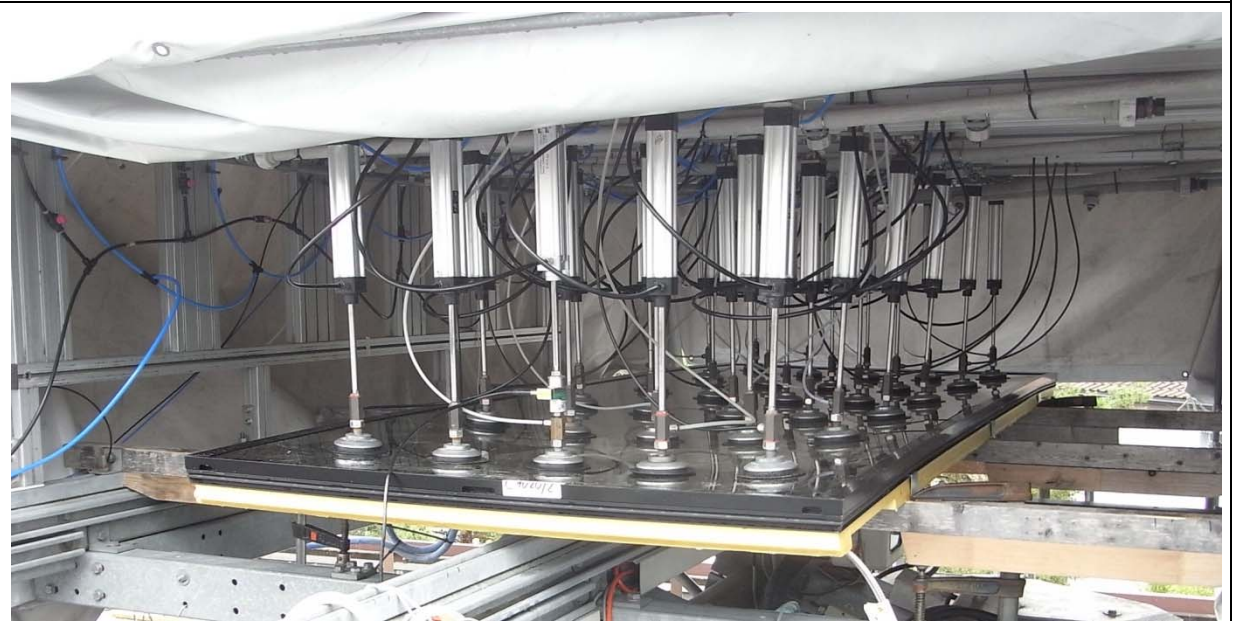
Picture 4  
24 suction cups evenly distributed over the collector surface. Positive and negative forces applied up to 3250 Pa. On the picture uplifting force of 3200 Pa is shown. No problems observed

**Conclusion from stage 2:**

Using the stronger screws, three screws per hook and reinforced battens, no structural problems are observed for the collector and its casing for positive and negative loads up to 3250 Pa. Strong deformation of the collector during the application of the force. The deformation is reversible and therefore not considered as a problem.

Stage 3

To apply higher loads the number of suction cups is increased to 30.  
Else the installation is the same as described in stage 2.



Picture 5, 6

30 suction cups evenly distributed over the collector surface. Positive and negative forces applied up to 4100 Pa. On the pictures the maximum negative load (top) and positive load (bottom) of 4100 Pa is shown. Higher loads are not possible with the current installation.

No problems observed.

### 3 Conclusion

The collector Viridian Clearline V30 was tested for excessive wind and snow loads of up to 4100 Pa. No structural problem of the collector and its casing were observed. The mounting system used to install the collector on the roof is sufficient provided that at least three screws per hook are used and that the screws are of good quality and sufficient length. When installing the collector for extreme wind and snow loads high quality of battens with appropriate dimensions must be used.

### 4 Remarks

This addendum to the SPF test report C1020QPEN is valid only in conjunction with the test report C1020QPEN and may not be copied except in full.

This addendum is issued according to the requirements of ISO 17025.

Rapperswil, 26.05.2009



Dr. Andreas Bohren  
Head of SPF Testing



Dipl.-Ing. Walter Gubler  
Test engineer