

**SOLA-TECS**

**Examination** of PV Modules  
**before and after cleaning**  
with SOLA-TECS cleaning devices

## THEME

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The company Cleantecs GmbH has developed a new cleaning system called SOLA-TECS. With an examination it should be proven that no damage occurs to PV modules with a SOLA TECS cleaning device. BEC-Engineering GmbH was contracted by the company Cleantecs GmbH to examine PV modules with a mobile test centre.

## TASK

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The company Cleantecs GmbH, 89250 Senden, contracted the company BEC-Engineering GmbH, 85652 Ottersberg, to carry out an examination of the PV modules before and after cleaning with SOLA-TECS cleaning equipment. For the examination, the MPP output was determined and extrapolated to STC conditions, and the electroluminescence was compared, in order to determine possible damage to PV modules by SOLA-TECS cleaning devices. The following PV module types are each available 7 times: LUXRA PV 60R-250-6, NSI 190/72-M and SC75-EX-B.

The examination of the PV modules is based on the following defaults:

- > Extreme soiling of the PV modules <
- > Each PV module is cleaned 5 times with the SOLA-TECS cleaning device <
  - > PV modules are cleaned twice a year <
  - > Life expectancy of the PV modules – 20 years <

On the basis of these defaults the PV modules were subject to 200 cleaning cycles.

## COMPLETION

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The PV modules were measured on location on 12/03/13. The MPP output at STC conditions was determined for each module as well as the electroluminescence photographs before and after the cleaning of a module. The examination is carried out by the company BEC Engineering GmbH. The measurement of the PV modules occurs prior to the cleaning with the SOLA-TECS cleaning device, and then after the cleaning. In this context, 200 cleaning cycles are completed with the SOLA-TECS C700 and SOLA-TECS W800 cleaning device. (Image 1)

## RESULT

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With the crystalline PV modules that were examined, no ascertainable change to the performance is evident after 200 cleaning cycles. It was not possible to observe any noticeable change to output with the use of harder brushes either, such as cleaning device W800. A visual examination of the electroluminescence photographs before and after the cleaning cycles did not show any change to the cell materials. Neither new micro-cracks have occurred in the cell material, nor have existing micro-cracks worsened due to the stress. Inactive areas have not occurred. No scratches or surface manipulations caused by the cleaning process were evident in a visual test. (Image 2-3)

## IMAGERY



Image 1: Presentation of the module cleaning process with the C700 cleaning device

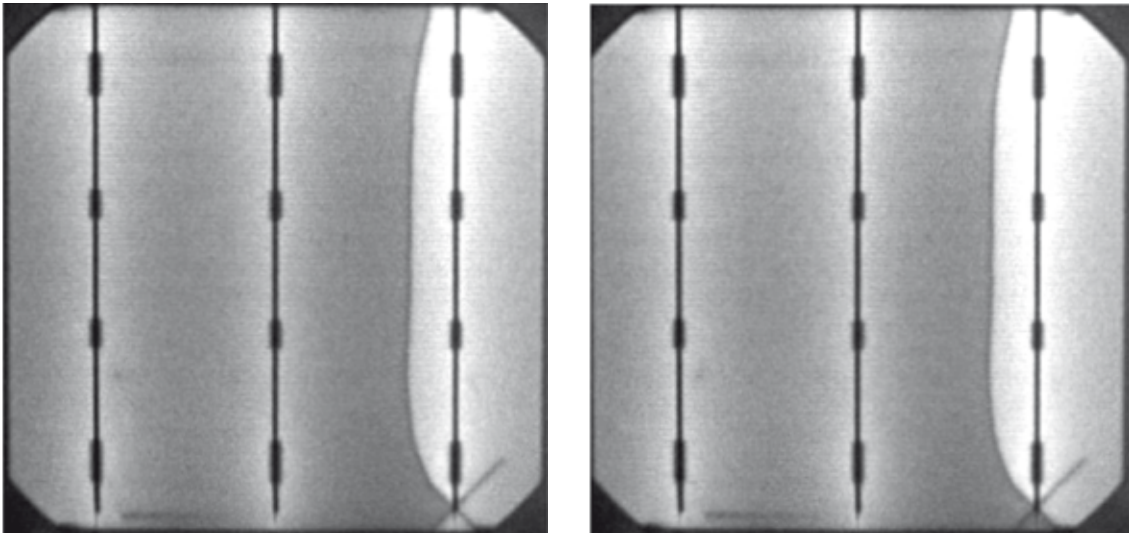


Image 2-3: Exemplary EL photograph of an individual cell of the PV module LUXRA PV 60R-250-6 (SN 21154512061104449) with prior damage before (left) and after (right) the cleaning cycles

## CONTRACTOR

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Cleantecs GmbH  
Hofackergasse 3  
D-89250 Senden - Hittistetten

T: +49 (0) 7307 92 65 0  
F: +49 (0) 7307 92 65 20

[info@cleantecs.de](mailto:info@cleantecs.de)  
[www.cleantecs.de](http://www.cleantecs.de)

## PROCESSOR

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BEC-Engineering GmbH  
Zweigniederlassung Schabing  
Kellerstraße 8  
D-83119 Obing

T: +49 (0)8121 884567 0  
F: +49 (0)8121 884567 88

[info@bec-engineering.de](mailto:info@bec-engineering.de)  
[www.bec-engineering.de](http://www.bec-engineering.de)