pv magazine

Quality Roundtable 2018

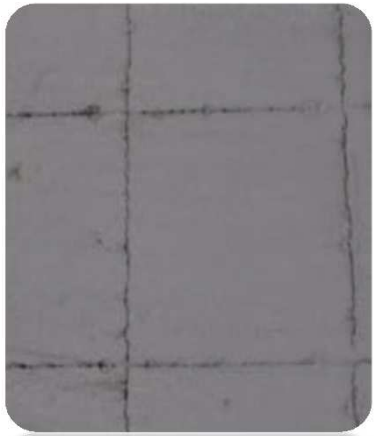
Latest amendment of IEC 61730 and its impact on backsheet quality assurance

21.06.2018 Jörg Althaus - TÜV Rheinland

TÜVRheinland®
Precisely Right.

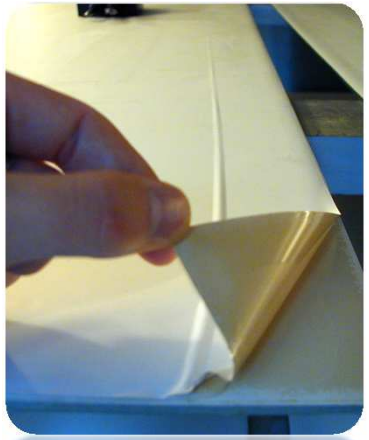
Incidents of Field Failures of Backsheets are Increasing

Not only one type of backsheets, not only one type of failure



Cracked backsheets with electric breakdown in isolation.

Powder effect of backsheet (“chalking”) leads to loss of UV protection.



Delamination and detachment of backsheet; interlayer and total delamination possible.

Bill of material not sufficient to withstand the climatic stress. Early wear out.

Insufficient process control leading to delamination

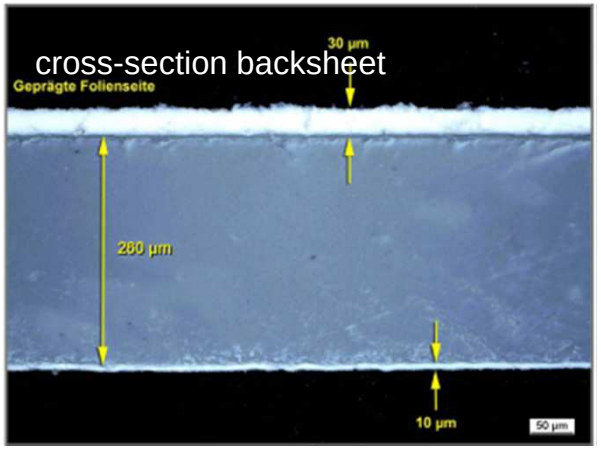
! Cost saving strategies of the last 6 years lead to material thickness minimization and introduction of backsheets designed to meet minimum requirements, rather than being made to last.

TÜVRheinland®
Precisely Right.

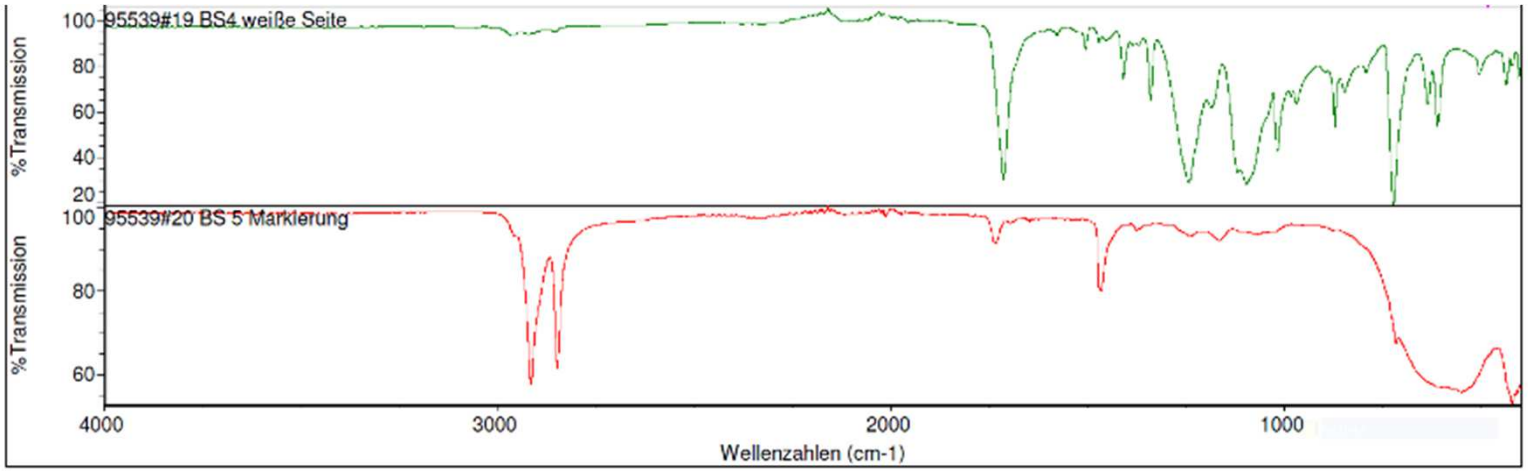
Failure analysis and material identification

Typical questions in case of a failure

- Is the material the one defined in the contractually agreed and certified bill of materials?
- How does the failure propagate?
- Will unaffected modules be affected in the future?
- Who is to blame?



→ Material analysis
→ Failure propagation testing
→ Keep spare modules for relative analytics

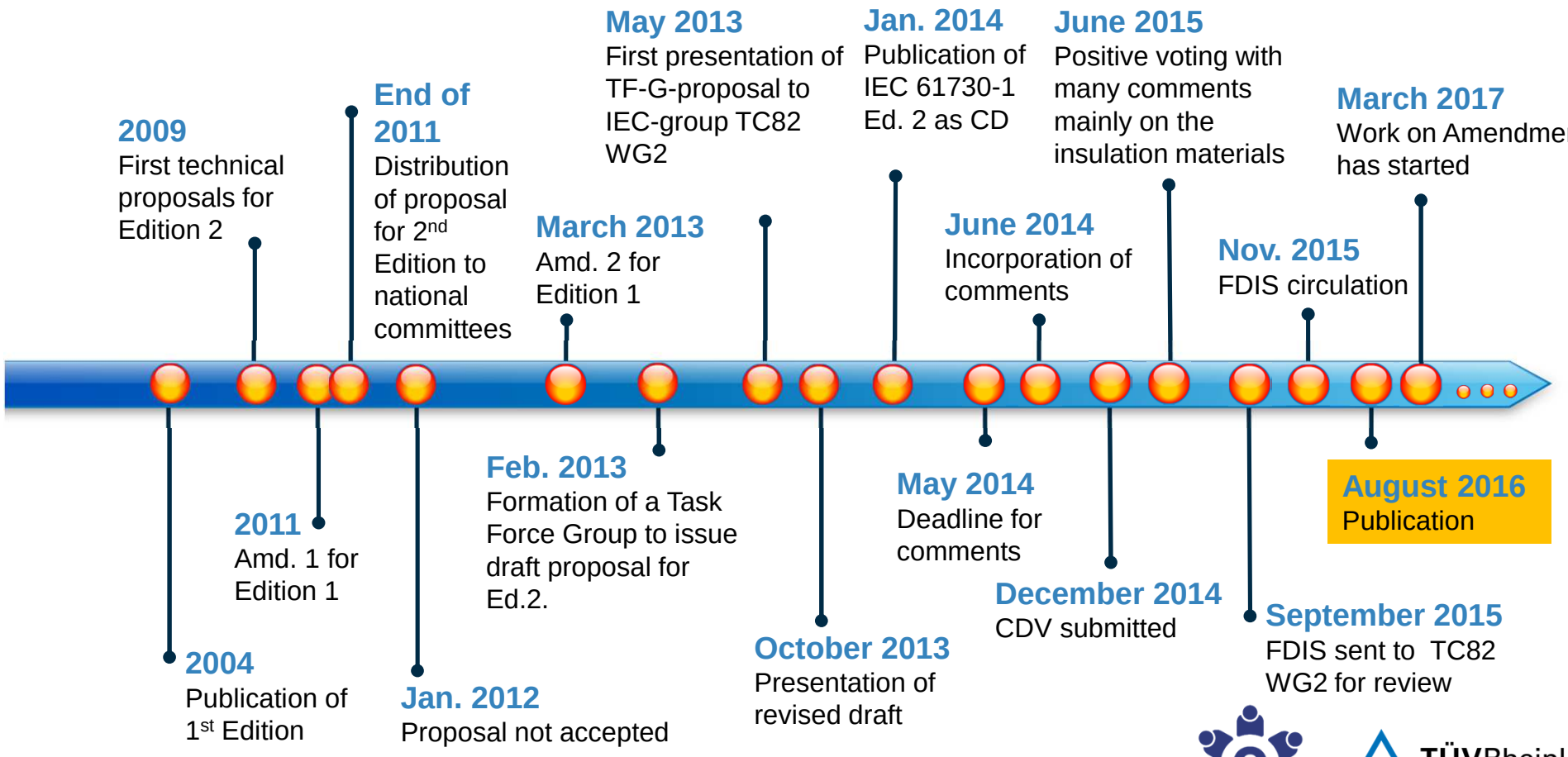


FTIR-spectrogram of module vs. original backsheet sample

TÜVRheinland®
Precisely Right.

How did the standard development community answer to the failure rates?

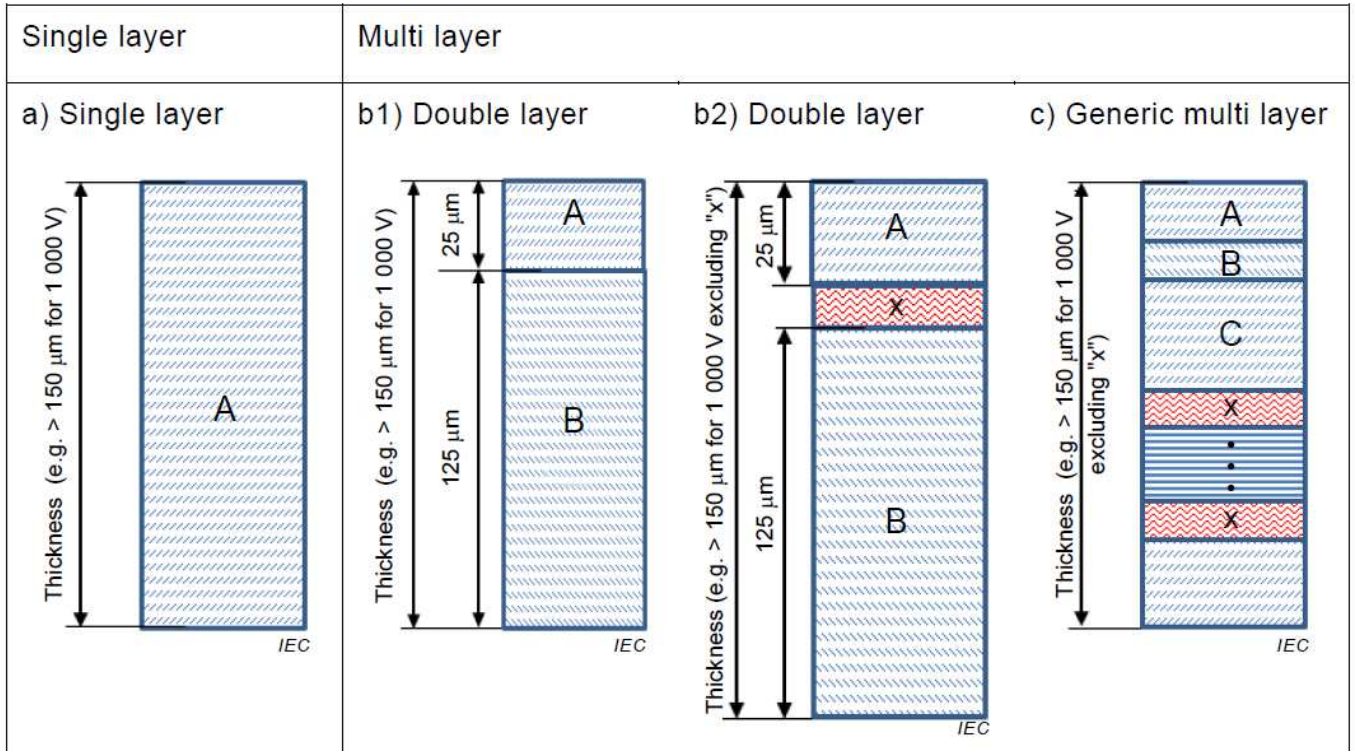
Updating IEC 61730 was a lengthy process started in 2009…



TÜVRheinland®
Precisely Right.

Changes to Safety Standard IEC 61730-1 / -2

Definition of layers and their thickness | additional more severe UV test sequence



Source: IEC 61730-1 Figure 4

Sequence B
of IEC 61730-2

1 PV module
(unframed if Peel test is required)

- Damp heat test (200 h) MST 53
- UV test (**60 kWh/m²**) MST 54
- Humidity freeze test (10 cycles) MST 52
- UV test (**60 kWh/m²**) MST 54
- Humidity freeze test (10 cycles) MST 52
- Cut susceptibility test MST 12
- **Insulation thickness** test MST 04

TÜVRheinland®
Precisely Right.

Experience with new IEC 61730-1 / -2 so far

- Minimum thickness requirement has eliminated some designs from the market.
- In our lab in Germany > 30 % of the modules tested to the new standard show some form of “chalking”.
- No clear tendency for particular material combinations or backsheet designs.
- “Chalking” is not defined as a failure in the IEC pass criteria, as it is a new phenomenon.

- Testing of affected modules from the field acc. to the new sequence shows test sequence is adequate to propagate effects.
- New amendment may require material prequalification.
- Publication of IEC TS 62788-2:2017 *Measurement procedures for materials used in photovoltaic modules - Part 2: Polymeric materials - Frontsheets and backsheets* in August 2017.

TÜV Rheinland
Dipl.-Ing. Jörg Althaus
Regional Field Manager Solar
+49 (0)221 806 5222
solarenergy@de.tuv.com
www.tuv.com/solar

Thank you for your attention!

Available NOW:

- Press release on **Measurement Uncertainties**
- Press release on **North American Market Access** (new UL 61730)
- PV-tech article on **Power rating and qualification of bifacial PV modules**
- PV-tech article on **Failure assessments of PV systems demonstrate the importance of elective Quality Assurance**
- White papers on **Energy Yield Assessment in Different Climates**
- TÜV Rheinland **Quality Monitor 2018**
- Upcoming **Webinar** on **Verifying Quality and Power Output of Bifacial Modules** 05 June 2018

TÜVRheinland®
Precisely Right.