



25 – 26 November 2025  
Chamber of Commerce  
Florence, Italy



**Lenneke Slooff-Hoek**

TNO Solar Energy, The Netherlands

# **Cassette PV: An easy mounting solution for PV façades**



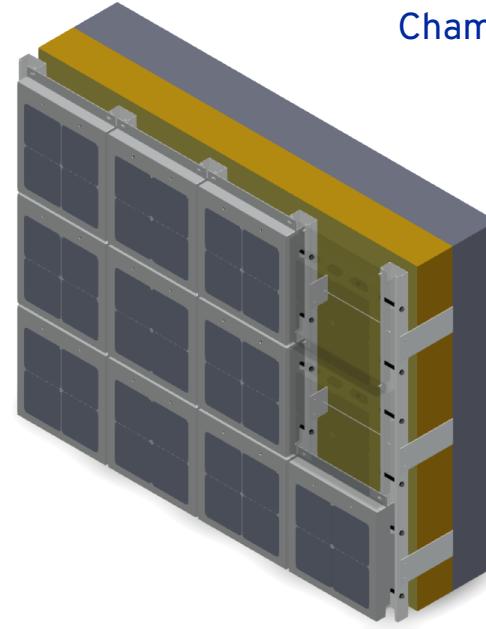
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# Introduction

In façade construction, cassette systems are often used as it enables quick and easy installation of façades.

Combining this concept with PV offers a solution for quick adoption by the building sector.

It has the potential to reduce installation costs, installation time, and material usage.



Copyright: Sorba Projects



# Concept

First approach

## Module stack

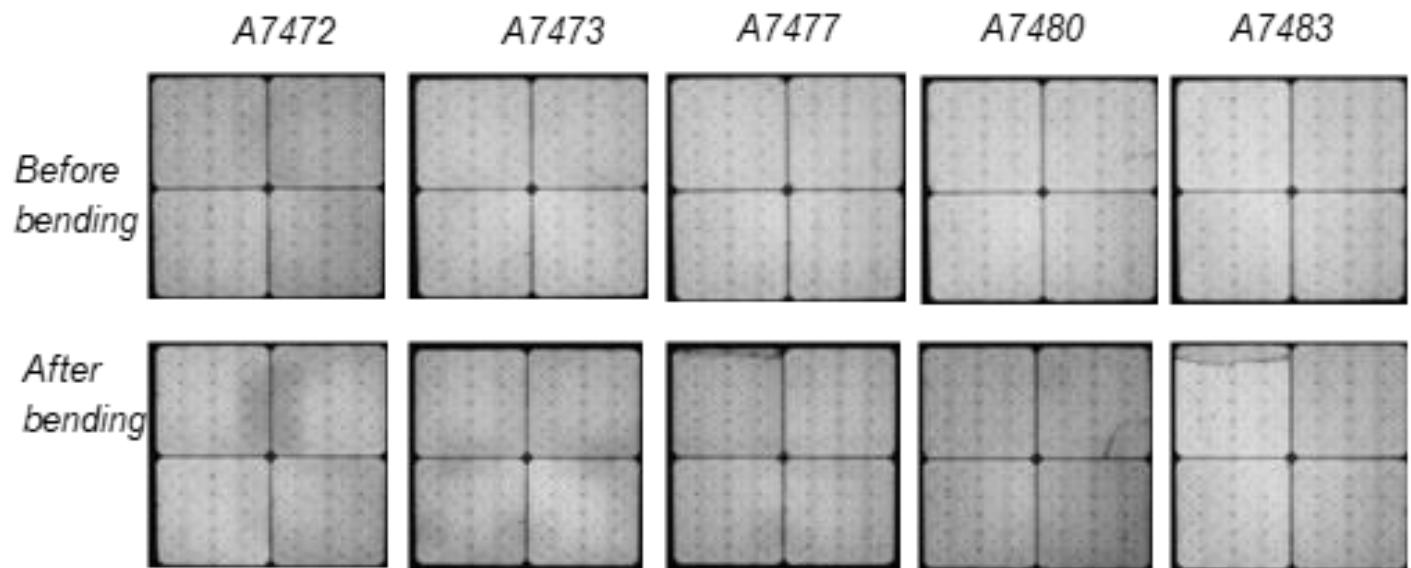
ETFE Front sheet  
Encapsulant POE  
Clear Film with print  
Encapsulant POE  
Solar Cells  
Encapsulant POE  
Fire resistant Aluminum composite



# Results: EL before and after bending

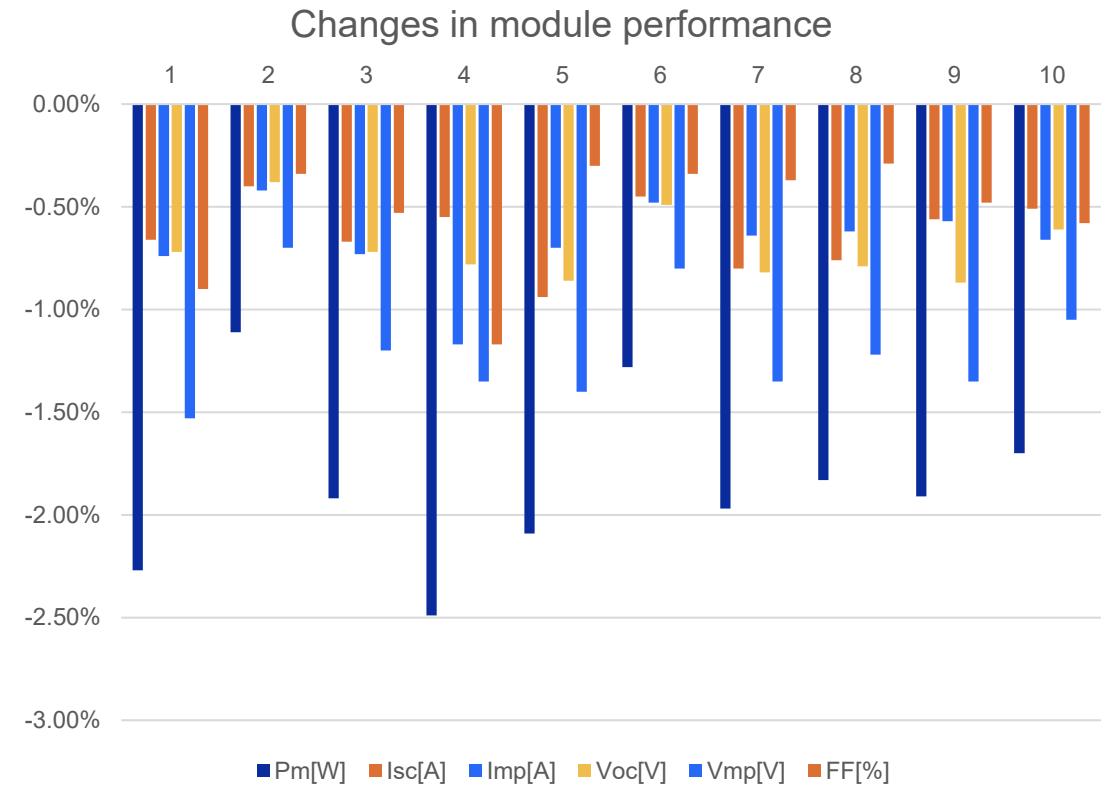
## First approach

- 5 out of 12 modules suffering from the mechanical forces due to milling and bending the PV modules into the cassette shape
- new cracks in solar cells in module A7477 & A7483.
- Parts of the interconnection in modules A7472 & A7473 suffering from increased serial resistance.
- A7480 shows one crack grew.



# Results: Performance

- 10 samples have been tested
- IV-measurements show:
  - Difference in cell parameters before and after bending less than 2.5%



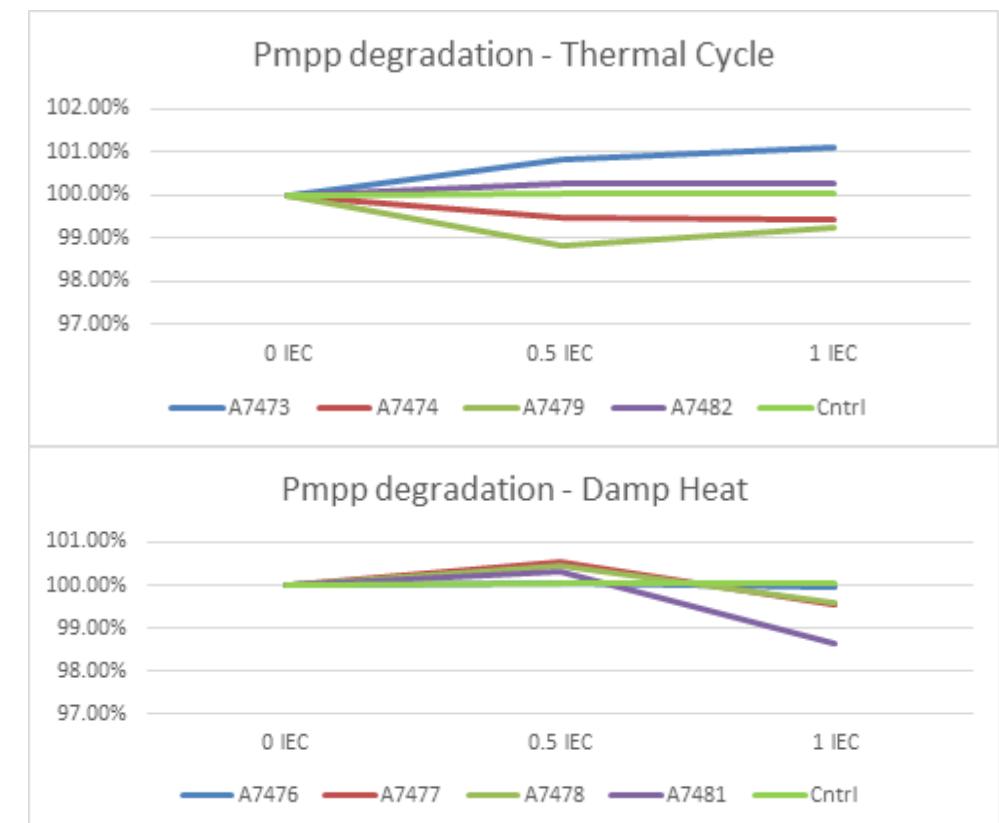
# Results: Damp Heat and Thermal Cycle

## First approach

Maximum allowed degradation limit is 5% in power after 1x IEC test according IEC61215.

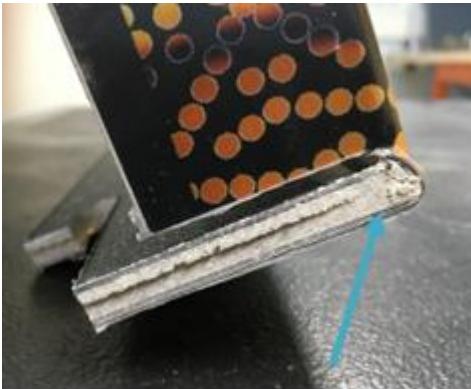
- Tested samples passed 200 cycles Thermal Cycle
- And 1000 hour Damp Heat test.

No visual changes after to Damp Heat and Thermal Cycle.



# Results: Adhesion properties

- 👍 Visually very good looking
- 👎 Core of sandwich is broken after bending



# Concept

## New approach (TSE PVGoCassette)

- Replace front material by a non-fluorine material: PET
- Use alternative encapsulants as they might give better resistance against fire
- Tune the processing conditions

## Module stack

PET (or similar alternative) Front sheet

Encapsulant

Clear Film with print

Encapsulant

Solar Cells

Encapsulant

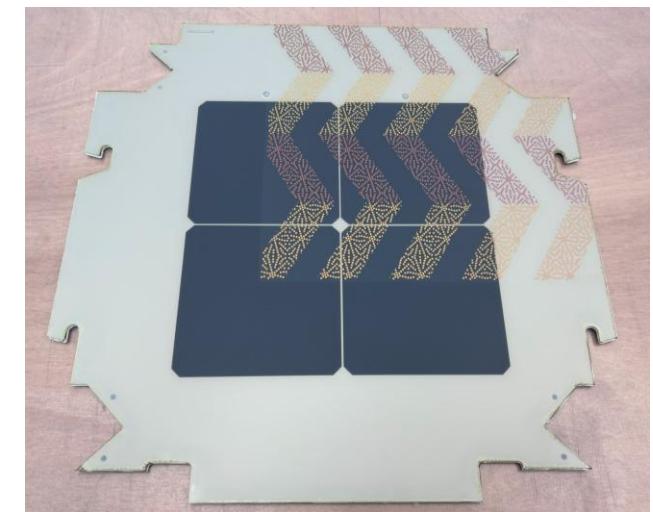
Fire resistant Aluminum composite



Sample 1 – after lamination



Sample 1 – after LASER trimming  
the edges



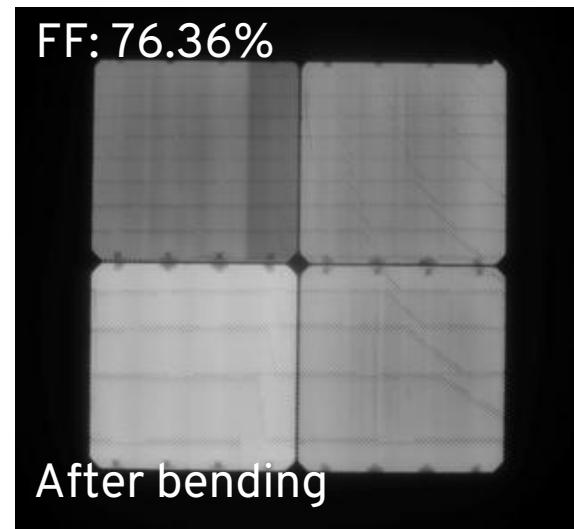
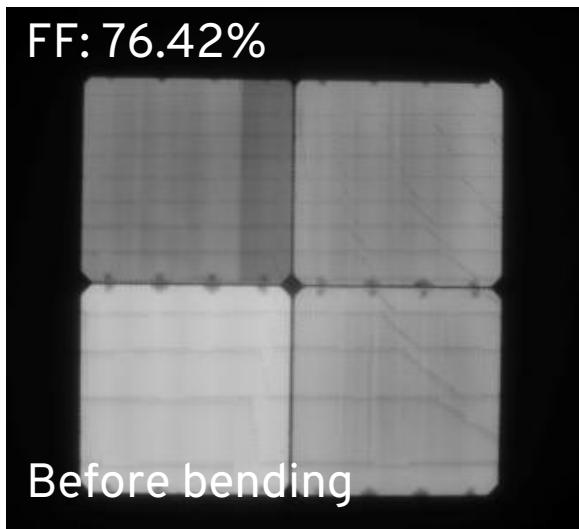
# Results: Adhesion Properties

- Visually good looking and good adhesion
- Delamination after bending or creep tests
- Poor adhesion between TPO and clear film
- No impact of primer application on the Al surface
- Bending at different temperatures makes the process easier however delamination occurs at all instances



# Results: Performance and EL measurements

- Bending does not have an impact on the electrical properties



## Next Steps:

- Thick PET front sheet will be replaced with a thin version or alternative (i.e. ETFE/PET sandwich)
- POE usage will be revisited.

- Fire class determination tests are planned with the final BoM
- Qtrack color stability tests are planned with the final BoM

# Acknowledgement

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# Thank you!

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