

# Advanced Fluoropolymer-Free, High-Grade PET-Based Backsheet Reaching Over 3,000 Hours DHT\*

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## INTRODUCTION:

- PV manufacturers design modules for long-term outdoor durability.
- Damp Heat Test (DHT) is the main differentiator for good quality backsheet.

We developed a methodology for fabricating high-grade PET and adhesives with our partners. This method resulted in the only PET-based backsheet to withstand 3,000 hours of DHT.

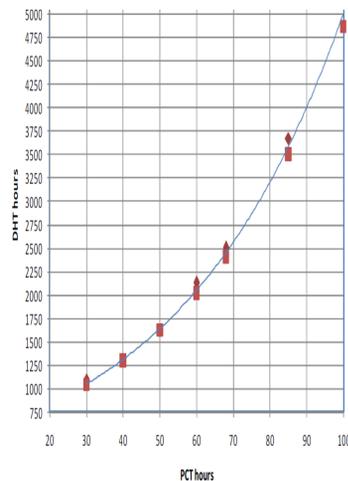
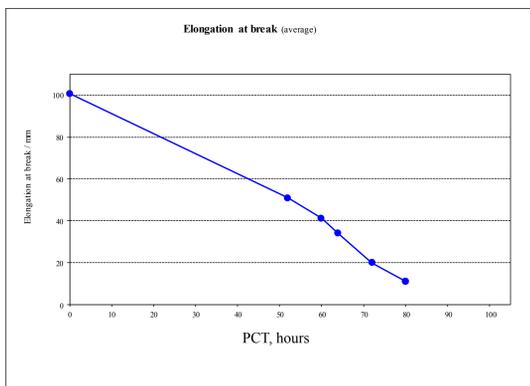
## Sample Preparation – Pressure

### Cooker Test (PCT)

Two layers of high-grade PET were selected and laminated (Duplex) with a special adhesive. Duplex strips were then put into a Pressure Cooker chamber at 121°C and 100% Relative Humidity. After 80 hours of PCT, the Duplex still retains more than 10% of Elongation to Break (ETB). This is estimated to be equivalent 3,000 hours of DHT.



**Duplex**

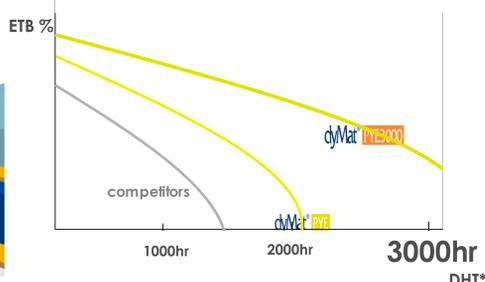
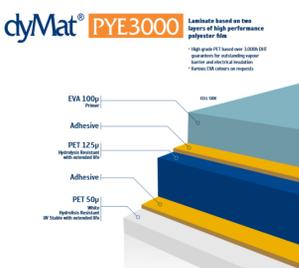


ETB is measured with an Electronic Dynamometer

DHT vs. PCT based on Coveme experience with hydrolysis-resistant PET

## CONCLUSIONS:

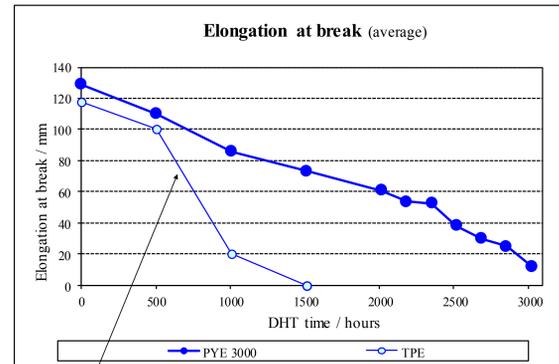
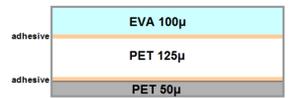
- Pre-selection of the right, high-grade hydrolysis-resistant PET films was key.
- Adhesive system development was also fundamental to achieve the desired product.
- Note that the proper selection of the high-grade hydrolysis-resistant PET films affects positively the adhesion value and overall performance.



Standard PET-based backsheets show degradation around 1000-1300 hours of DHT.

## DHT Verification

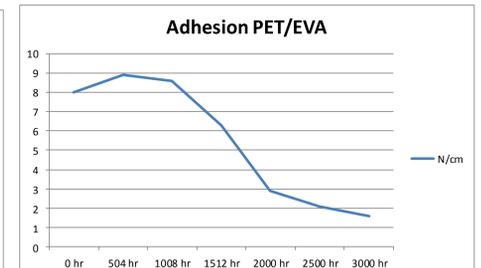
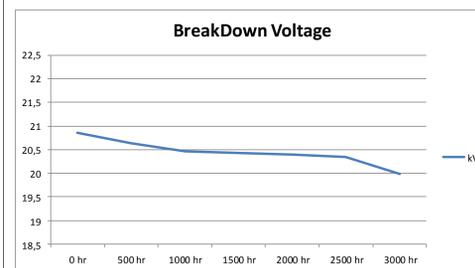
3,000 hours of DHT was also verified with the dyMat PYE 3000 backsheet (Duplex with the EVA layer).



After 18 weeks or 3024 hours of DHT, the PYE 3000 still retained more than 10% of ETB.

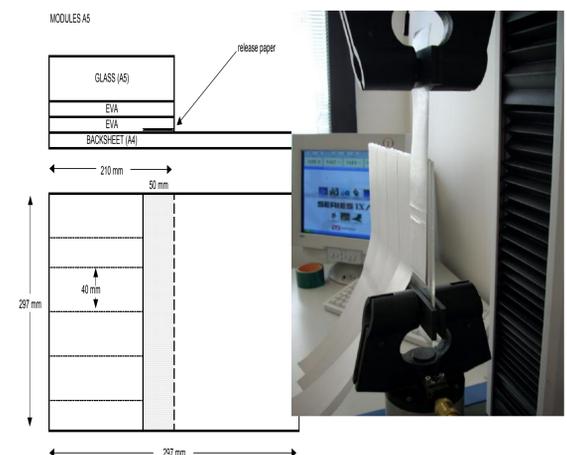
TPE typical ETB curve

The quality of the selected films positively affected the adhesion.

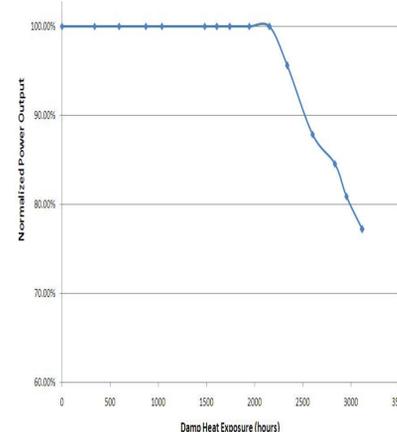


## DHT on Module

The dyMat PYE 3000 was then laminated into A5-size dummy modules and put into the DHT chamber. After 3000 hours, the visual inspection was very positive. Adhesion tests were also carried out.



## Our Customers' DHT Results



The dyMat PYE 3000 was then laminated into full-size modules by our customers, reaching over 3,000 hours DHT. Many customers are already using it, and the modules are UL and TUV certified.