An Edge Sealing "Getter" Tape for Ultra-long Lifetime (up to 3000 hours) of Thin Film CIGS PV Modules

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Background and Objectives

Long term stability, reliability and operational lifetime of PV modules are essential for their commercial success. This is especially true for modules based on thin film technologies like CdTe, CIGS and a-Si. Since both performances as well as yield may be strongly affected by environmental conditions, proper encapsulation architecture is important to obtain the desired long term outdoor stability.
We have focused on the moisture ingress along the edges of the module, which is believed to be the main cause of degradation over time.

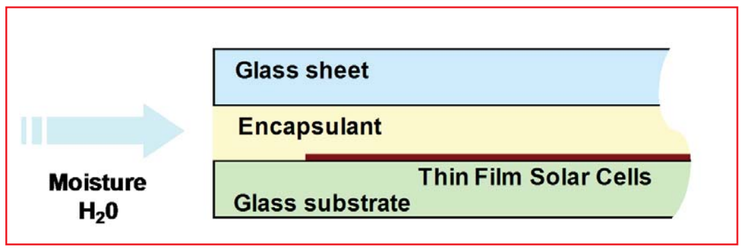
B-Dry

The joint action of low permeability thermoplastic polymer and SAES Getters proprietary powerful moisture absorbing materials makes B-Dry® the first edge sealant optimized as active barrier against moisture ingress which assures extra-long term stability to thin film PV modules. B-Dry has the ability to completely stop the moisture ingress, reducing the WVTR to values lower than 10^{-3} g mm / m^2 day until the chemical saturation of the moisture absorbing material after several thousand hours of Damp Heat testing time (85°C, 85% r.h.).

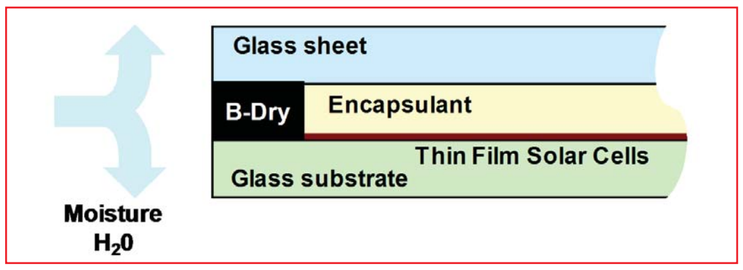
B-dry edge sealant

B-Dry® black thermoplastic edge sealant tape:
Thickness: 0.4 mm to 1.1 mm
Width: 7 mm to 12 mm.

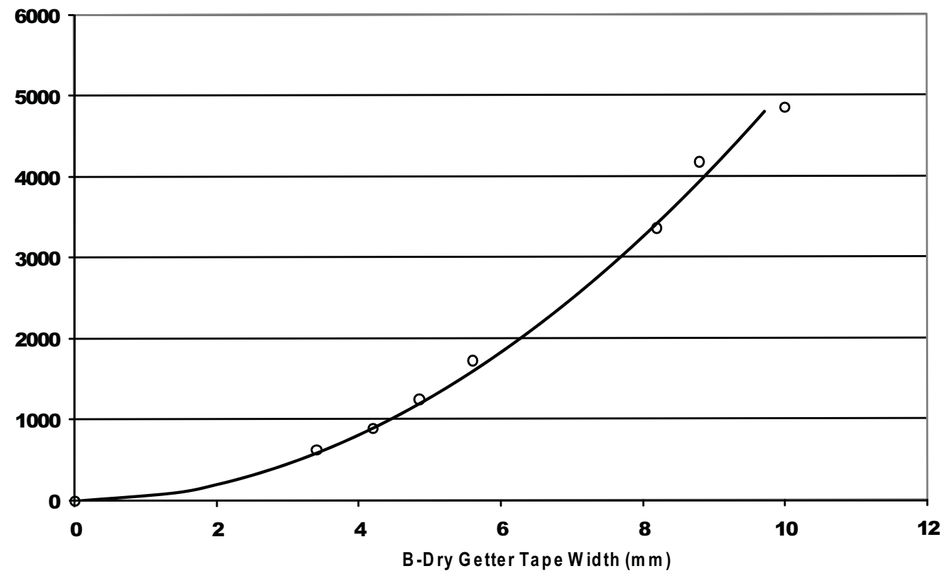
Moisture ingress without B-dry



B-dry edge sealant as an Active Barrier

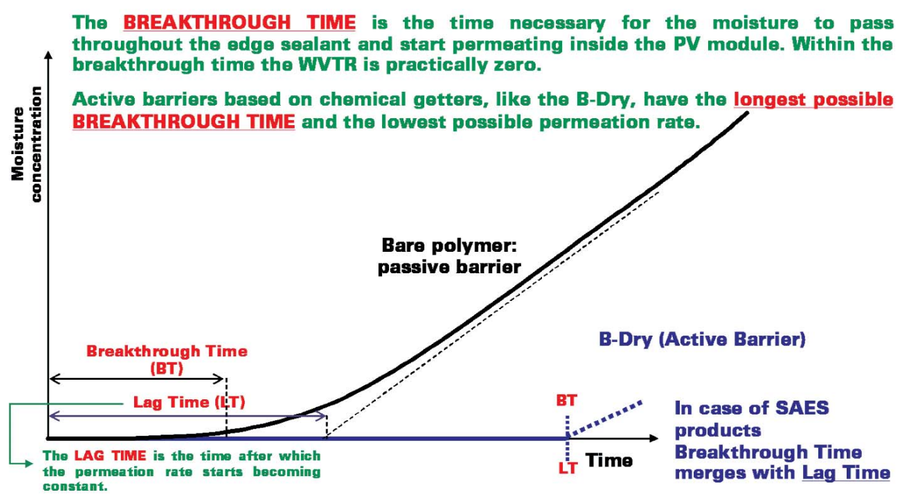


B-Dry® is compatible with most common PV module encapsulation processes and materials (EVA, PVB, TPO)
Process temperature range: 140°C to 170°C.

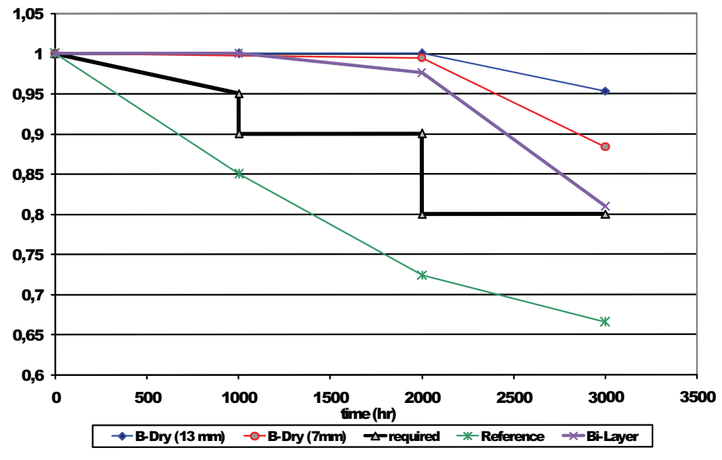


B-Dry® protects against moisture ingress with a relatively small tape width.

Features and Results

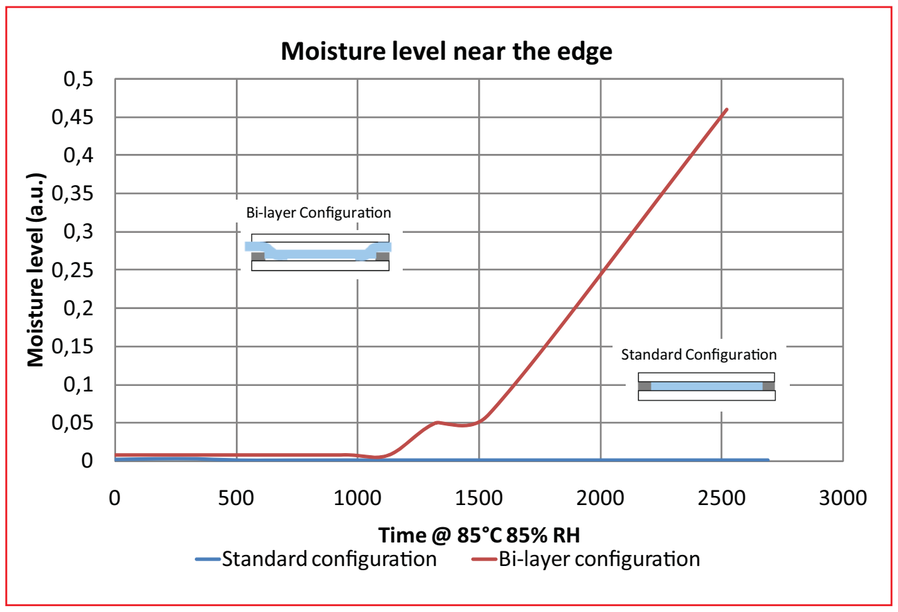


Damp Heat stability: Performed at ZSW



Relative efficiency after damp heat 85°C 85% R.H. for 30 cm x 30 cm CIGS modules.

Kinetic of moisture penetration during damp heat: Performed at Kuraray laboratories



Moisture penetration at 85°C 85% r.h. within the encapsulant (Kuraray PVB) after damp heat for 30 cm x 30 cm dummy modules. (Reflection Analyzer (PIER-ELECTRONIC) (B-Dry® is 10 mm wide)

Electrical isolation

Before DHT 1000 hours	Before DHT 1000 hours
B-Dry®: 0.20 µA	B-Dry®: 0.25 µA
No B-Dry®: 0.20 µA	No B-Dry®: 0.99 µA

Wet leakage current of 30 cm x 30 cm CIGS modules encapsulated with PVB before and after 1000 h of damp heat.

Conclusions

- B-Dry® shows a very high moisture barrier property
- B-Dry® ensures very good damp heat stability
- B-Dry® ensures high electrical isolation

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