B-Dry

Thermoplastic Edge Sealant with Getter Technology

HIGHLIGHTS

General Features

- ☐ Outstanding moisture protection of photovoltaic modules up to 4500 hours in Damp Heat Test
- ☐ Excellent adhesion to glass and backsheet materials
- ☐ Unsurpassed electrical isolation
- ☐ Stable under UV radiation
- ☐ Compatible with photovoltaic module encapsulation processes (vacuum lamination, autoclave)
- ☐ Compatible with the most popular encapsulant materials (EVA, PVB, TPO) for photovoltaic modules
- ☐ Black uniform color for the best aesthetic appearance
- ☐ Possibility to skip the trimming process
- ☐ High yield production process and high machine up-time
- ☐ UL recognized material
- ☐ IEC 61646, RoHS and REACH compliant

Applications

- ☐ CIS and CIGS Thin Film Photovoltaic Modules
- ☐ CdTe Thin Film Photovoltaic Modules
- ☐ a-Si (single and multi-junction) and μ-Si (tandem junction) Thin Film Photovoltaic Modules
- ☐ Mono and Poly Cristalline Silicon Photovoltaic Modules
- ☐ Photovoltaic Modules implementing Organic Solar Cells
- ☐ Photovoltaic Modules implementing Dye Sensitized Solar Cells

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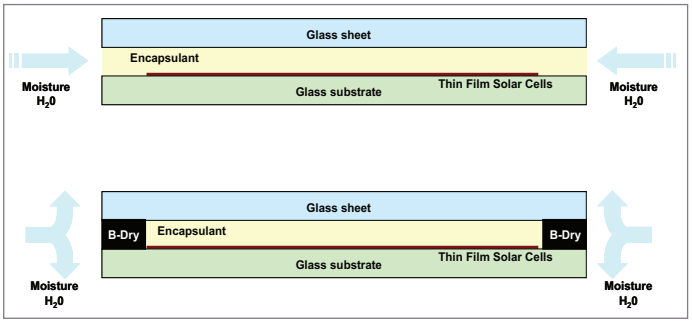
saes getters

The long term stability of thin film photovoltaic modules

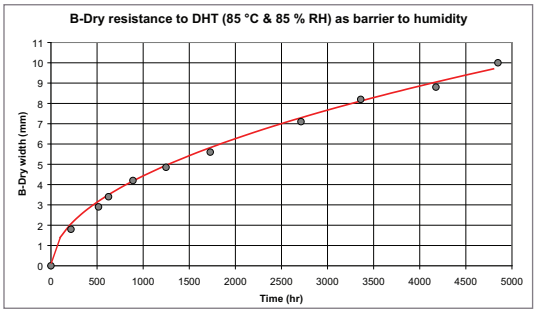
The long term stability, reliability and operational lifetime of photovoltaic (PV) modules, especially based on thin film technologies (CdTe, CIGS and a-Si), are essential for their commercial success since both performances as well as economics may be strongly affected by the environmental conditions. Therefore proper encapsulation architecture is of capital importance in order to obtain the desired long term outdoor stability. Especially the moisture permeation along the edges of the module is by far the main cause of degradation over time. Moisture can accelerate the power output drop over time due to corrosion effects on the top and bottom electrodes or increase of the series resistance and reduction of the fill factor or even reduction of the encapsulation material optical transparency. It is recognized that encapsulation materials achieved a significant capability to reduce the moisture leakage from outside. In spite of this, it is actually impossible to assure stable energy efficiency of thin film PV modules for over 25-30 years without the adoption of a proper edge sealant material positioned along the edges.



The stability of thin film PV modules, especially in very humid and harsh environments, can only be guaranteed by the edge sealant as an active barrier to moisture.

An enabling technology based on Getter materials

The joint action of a low permeability thermoplastic polymer and SAES Getters core competences on powerful moisture absorbing materials makes B-Dry the first edge sealant working as Active Barrier to the moisture permeation able to assure extra-long term stability to thin film PV modules. B-Dry has the ability to completely stop the moisture flow into the module by 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 Test takes place.



The photovoltaic modules with B-Dry as edge sealant have been proven to be stable in terms of power output and energy efficiency up to 4500 hours in Damp Heat Tests conditions.

B-Dry is offered as black tape whose thickness and width can be properly tailored to match the thicknesses of conventional encapsulation foils and the width of the edge deletion areas. B-Dry is UV resistant and the black color perfectly matches the uniform thin film solar cells color as well as the best aesthetic requirements.

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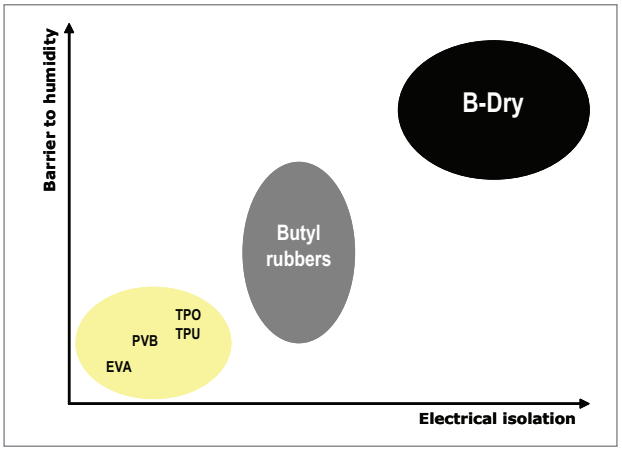
B-Dry material is also a superior electric isolator able to withstand high voltage without electric breakdown and to stabilize the PV module leakage current over time.

B-Dry has been developed in order to be compatible with the common encapsulant materials (EVA, PVB, TPO) and with all photovoltaic module encapsulation processes such as vacuum lamination and autoclave. B-Dry does not require any curing neither cross-linking and therefore it allows even very fast lamination processes.
In addition, B-Dry exhibits the proper stiffness and elasticity to be easily handled by automatic equipments with high speed and up-time, assuring a high throughput of the back-end line.

The adoption of B-Dry might eliminate the use of aluminum frames in specific applications exploiting the opportunity of manufacturing frameless modules. B-Dry can be implemented inside high-end c-Si photovoltaic modules, with superior properties, like those ones used for BIPV applications, as well as all the thin film technologies (CdTe, CIGS and Thin Film Silicon) where excellent stability over time is requested, from ground-mounted installations to architectural and building applications, like facades and windows.

B-Dry Properties

B-Dry is a composite thermoplastic edge sealant for photovoltaic modules in form of a black tape: the thickness varies between 0.5 mm and 1.4 mm and width between 7 mm and 20 mm. B-Dry exhibits the unique combination of moisture barrier properties and high electrical isolation compared to other traditional materials used in photovoltaic modules.



B-Dry is compatible with the most common photovoltaic module encapsulation processes and it can be easily processed in the temperature range between 140 °C and 170 °C.

Another very important property of this product is the capability to withstand up to 24 hours of air exposure without any functional degradation.

** Lag Time: time during which the WVTR < 0.001 g/m² d at 85 °C and 85% RH*

B-Dry Physical and Chemical Properties		
Density	1.2 g/cm³	DIN 53479, 23 °C
Softening Point	135 °C	
H_2O sorption capacity	11%	Weight increase
Lag Time *	>4500 hours for 10 mm width	85 °C & 85% RH
UV stability	Yes	IEC 61646
Air exposure	24 hours	

B-Dry Mechanical and Electrical Properties		
Lap Shear Strength to glass	440 kPa	ASTM C961
Peel Strength to glass	0.3 N/mm	ASTM C794
Shore D Hardness	42	UNI ISO 868
Shore A Hardness	90	UNI ISO 868
Bulk Resistivity	3.4 x 10^{13} Ω cm	ASTM D257
Surface Resistivity	2.7 x 10^{12} Ω	CEI EN 61340
Dielectric Strength	54 kV/mm	ASTM D149

The SAES Getters Group manufacturing companies are ISO9001 certified, the Asian and Italian companies are also ISO14001 certified. Full information about our certifications for each company of the Group is available on our website at: www.saesgetters.com

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