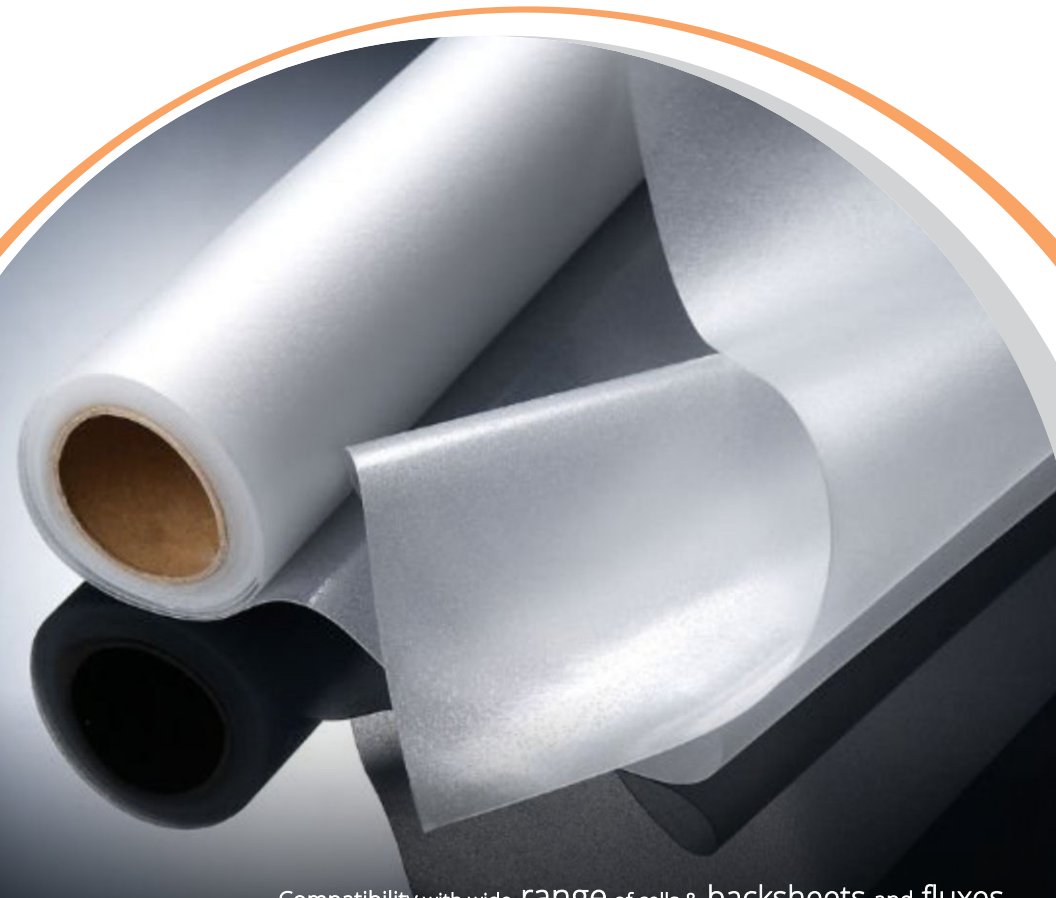




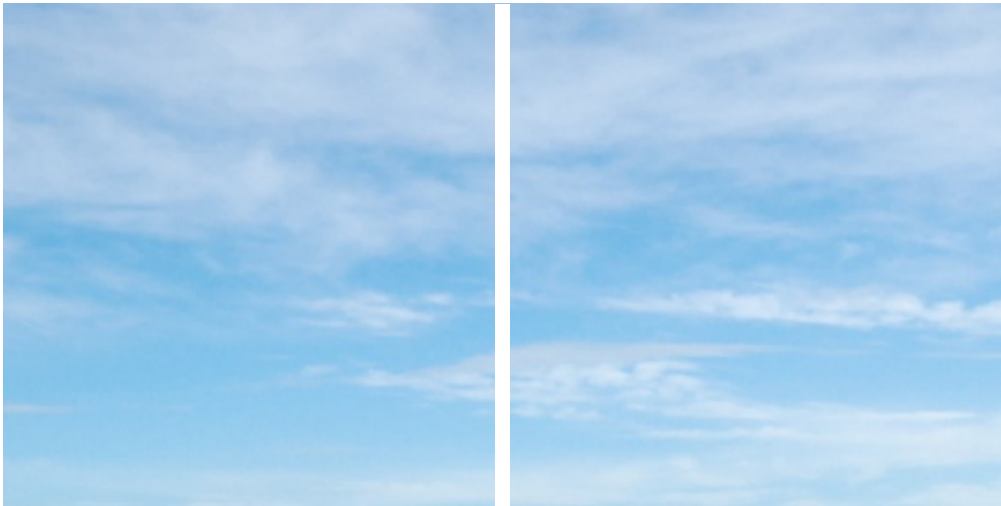
India's first &  
leading manufacturer of

## Solar EVA Encapsulants



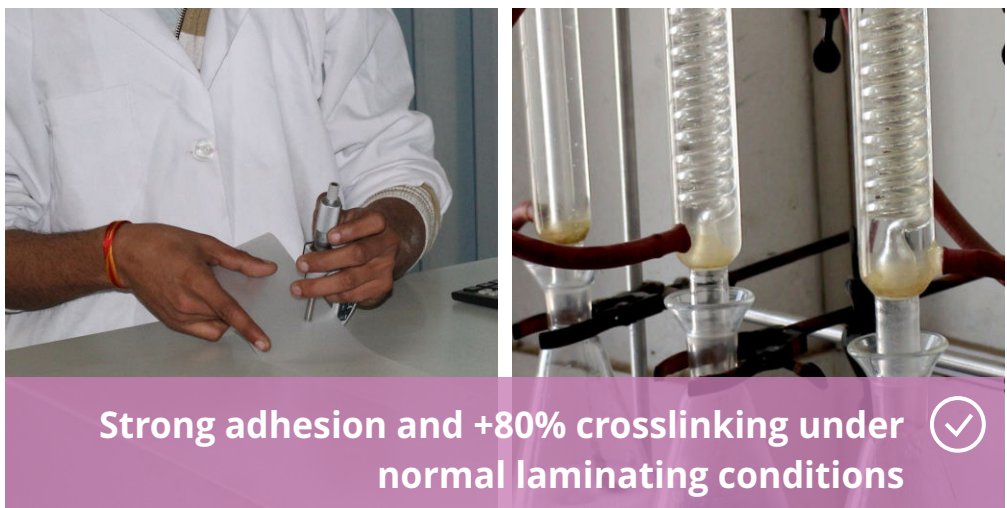
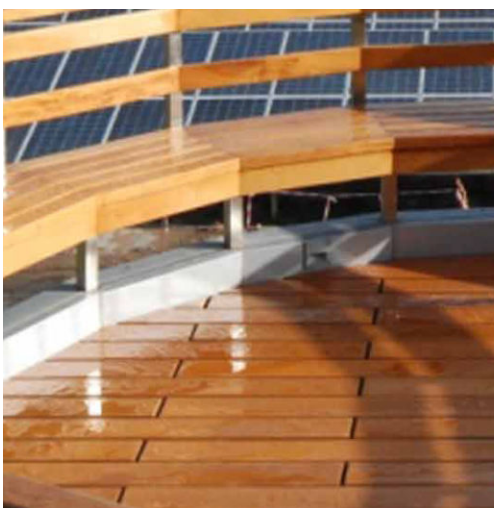
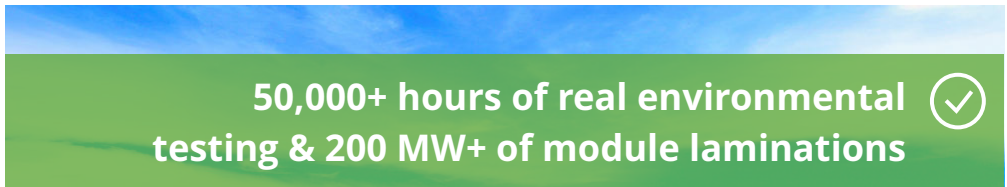
Compatibility with wide range of cells & backsheets and fluxes  
50,000<sup>+</sup> hours of real environmental testing  
Preferred by over 50 module Manufacturers, across 10<sup>+</sup> states  
Enhanced Transparency & PID Resistance 200MW<sup>+</sup> of module laminations  
Excellent peeling strength & crosslinking ratio  
Backed by over 30 years of EVA processing experience





With over 50,000+ hours of real environmental testing and over 200 MW of module laminations, 'Brij Advantage' series of module encapsulation solutions have been serving the industry since 2011. Optimised for hot and humid conditions at its ultra modern & fully automated production facility, 'Brij Encapsulants' offer lower failure rates, better performance and slower degradation during module lifetime, providing better overall return on investments. With separate quality assurance team performing regular in-line quality checks, Brij assures that your modules will last not for 25 years but for a lifetime.

Minimise your risks, save on costs and stay protected.  
Stay 'Brij Protected'.

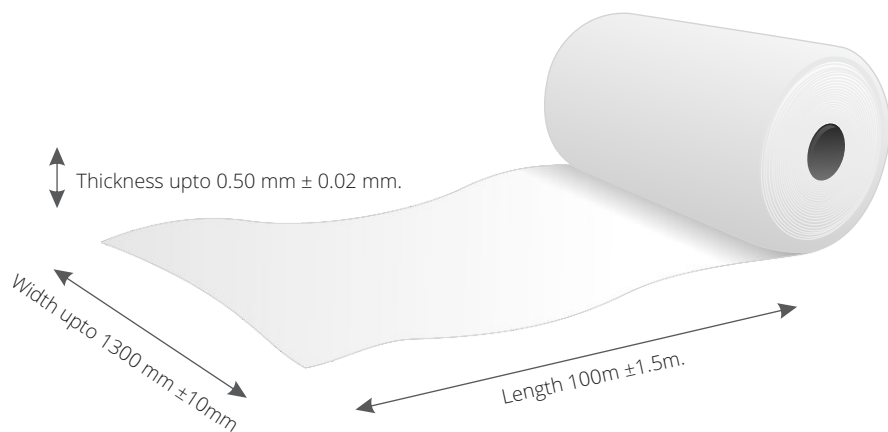




## ✓ Solar EVA Encapsulants

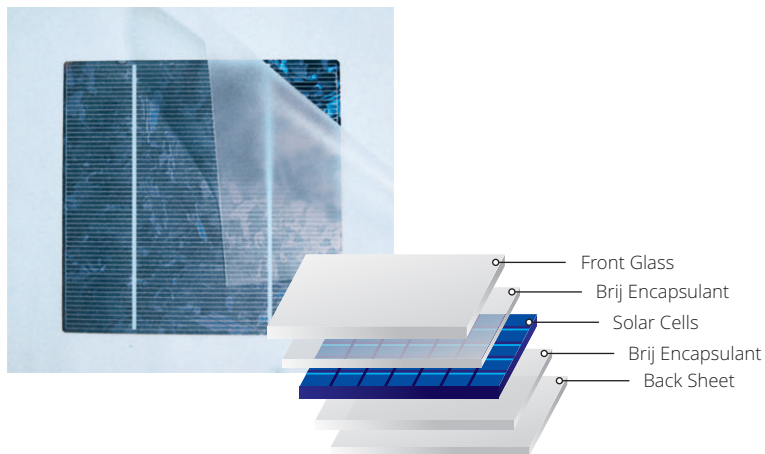
A solar module though looks simple, is a combination of highly engineered materials working in tandem to harness energy. One such component is the Ethylene Vinyl Acetate (EVA) encapsulant. This transparent layer of plastomer forms a protective layer over and under the solar cells preventing water, dirt and other external impurities from contaminating the cells and at the same time ensures optical transmissivity and electrical isolation. These encapsulants ensure that the module can be used outdoors for over 25 years without significant degradation.

## ✓ Product Characteristics & Specifications



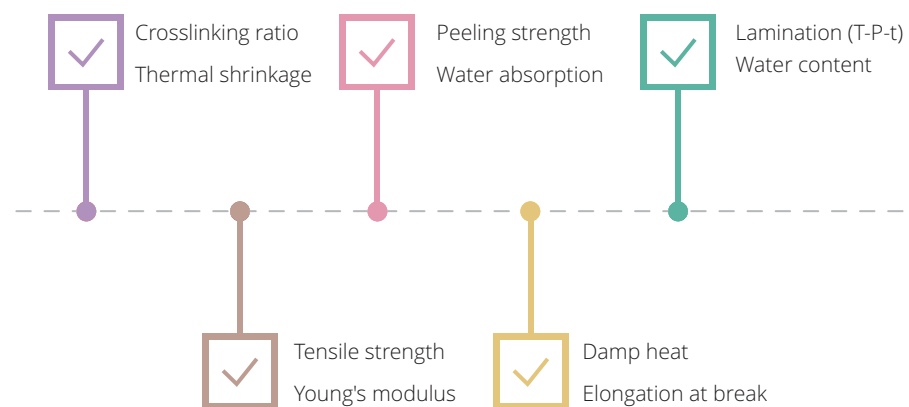
Item	Unit	Brij Advantage
Melt Index	g/10 mins	30
Softening Point	°C	58
Density	g/cm <sup>3</sup>	0.96
Appearance	-	Smooth surface with special knurling for better air exhaustion. Uniform thickness, no discoloration and non-stick at room temperature
Transparence (after curing)	%	≥ 92
UV - Cutoff Wave length	Nm	360
Crosslinking ratio	%	≥ 80
Peeling Strength	N/cm from glass	≥ 75
	N/cm from backsheet	≥ 48
Shrinkage Rate	%	≤ 2
Tensile Strength	MPa	≥ 21.5
Elongation at Break	%	≥ 518
Water Absorption	%	≤ 0.04
Dielectric strength	KV/mm	25
Resistance to temperature, moisture and cold	-	No bubble, no cracking, peeling or discoloration. No expansion with heat or contraction with cold. Power loss < 5%, and sheet ΔYI ≤ 2

\*Refer to our product data sheet for details



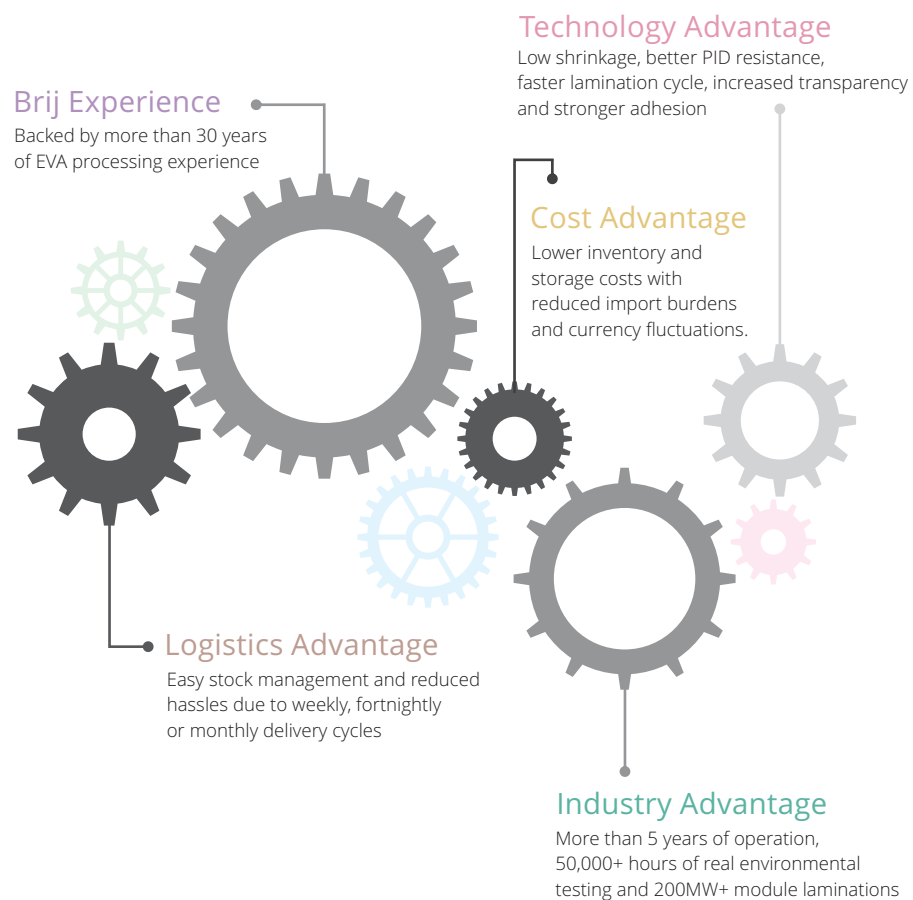
## ✓ Research, Development & Quality Assurance

Since its inception in 2011, Brij has been a leading manufacturer of solar EVA encapsulants In India. Brij invests in R&D to ensure continual improvement of its products through better formulations and to ensure price competitiveness through manufacturing process optimisations.



The quality assurance division at Brij certifies each batch for conformity to required ISO, ASTM and IEC standards through rigorous testing at Brij's internal test laboratory.

## ✓ The Brij Advantage



Switch today & experience the 'Brij Advantage'

### Considerations for selection of EVA Encapsulants

Since decades, photovoltaic modules have been encapsulated with crosslinked Ethylene Vinyl Acetate (EVA) sheets as they still provide the most optimal solution for protecting solar cells with the required degree of environmental protection. However apart from just being best protection, encapsulants serve multiple other purposes also. They physically hold module components in place, prevent erosion of inactive material, reduce ingress, optically couple separate materials like, glasses/PVDFs, protect components from mechanical stress and prevent materials from corrosion.

Encapsulant property	Functional Purpose	Impact on Module	Measured By*
Optical coupling	To ensure better absorption of incident solar radiation.	Increases efficiency and output.	Optical transmission and refractive index.
Electrical	To provide resistance to leakage currents.	Minimizes Hot spots, PID and soiling risks.	Volume resistivity and dielectric strength.
Mechanical strength	To help provide better support & fixation of solar cells and allied components.	Resistsues Cell breakage, micro cracks and deformations.	Mechanical strength, elongation at break, hardness, porosity.

With over 25 years of EVA processing experience and constant interaction with research organizations around the world, the R&D team at Brij analyses any such issue and ensures that every square meter of Brij EVA encapsulates solar module meets 25 years for a lifetime.

### Encapsulants Cost vs. Reliability

**Brij Vinyl Acetate (EVA) sheets or other EVA encapsulants are one of the most important components of the solar module and are responsible for its long-term reliability and performance.**

Solar modules generally use about 4.1MGs of EVA per MW of module capacity. At current EVA prices, this value is about 4% share in total module price. However, global numbers suggest that encapsulants are one of the most important components of a solar module and are responsible for more than 10% of module lifespan performance and reliability.

**Being more aware and being cheap, low quality encapsulants might not seem much difference in price per meter but can definitely end up having devastating effects on your solar modules including: Glass Degradation, yellowing and delamination.**

**With over 60,000 installations, 35,000 hours of real environmental testing and 25+ years of EVA processing experience, Brij has a product that is optimized for better but not least, cost, giving you better results for small investments.**

**To see that you buy EVA encapsulants, understand to read & use the Brij EVA.**

**Brij's Policy and experience: the "Brij Advantage".**

### Field issues in crystalline solar PV Modules

One of the factors in reducing the costs of photovoltaic systems is to increase the reliability and the service lifetime of the PV modules. Solar modules undergo harsh environmental stresses under constant variations of temperature and humidity. In addition, the modules also have to withstand 25 years in such conditions with an amount of 20% degradation in power, for them to qualify for most applications. This makes it necessary for manufacturers to not only take all possible precautions and care while manufacturing but also in identifying any defects in advance to ensure long-term durability and optimal processes. Solar modules for 25 years or a lifetime.

With over 25 years of EVA processing experience and constant interaction with research organizations around the world, the R&D team at Brij analyses any such issue and ensures that every square meter of Brij EVA encapsulates solar module for 25 years or a lifetime.

### Lamination: Key to module durability

Lamination is the most important process in making of solar modules. A good lamination ensures long life and durability of PV modules because an improper one can lead to early or premature module failure. Understanding the complete process can only help in producing a better product but also reduce losses like cell breakage, or bubbles and delamination, which compromise performance.

**The process:** The three-step process can be further divided into following:

- Layer:** An arrangement of glass-EVA-cell-EVA-backsheet in the order, as per requirement for lamination.
- Pre-lam:** Does the relative large temperature difference of about 100°C between the heating glass and the PV module layer upon lamination, glass heating (smoothing) of the bottom thick glass is observed. To avoid this glass warping and achieve homogeneous heating profile, the final laminator is equipped with an air that can be used for the PV module for up about 50mm from the heating plate, which results in more gentle and homogeneous heating of the glass.
- Vacuum-Upper-chamber:** The lower processing chamber of the laminator is evacuated to remove the air and avoid bubble formation. The level of applying vacuum is used as the rate of evacuation can be varied to optimize the process and hence the end result. Reducing the pressure too early or at a high rate will result in significant outgassing of the addition in the EVA to address premature optical degradation, and hence its dimensional quality of the PV modules, whereas applying the vacuum too late will lead air inclusion and hence unwanted bubble formation.

### ANALYSIS

#### Test Standards for Solar EVA encapsulation sheets

**“A PV module is not only judged by its electrical performance but also by its overall ‘operational’ and ‘product life time’.”**

**“EVA encapsulation sheets are the backbone of a solar module. They are responsible for the long-term reliability and performance of the module. Therefore, it is crucial to ensure that the EVA sheets used are of high quality and meet the required test standards.”**

**“EVA encapsulation sheets are the backbone of a solar module. They are responsible for the long-term reliability and performance of the module. Therefore, it is crucial to ensure that the EVA sheets used are of high quality and meet the required test standards.”**

### INTERVIEW

**Mr. Sudeep Goyal, Director Technology & Marketing at Encapsulants India**

**A good quality encapsulant would not only lead to better and longer module performance but also ensure healthy plant operation with lower failure rates and higher return on investments**

Encapsulants India talks to Mr. Sudeep Goyal, Director Technology & Marketing of Brij Encapsulants India to understand the market.

**Question:** How do you see the market for EVA encapsulants in India?

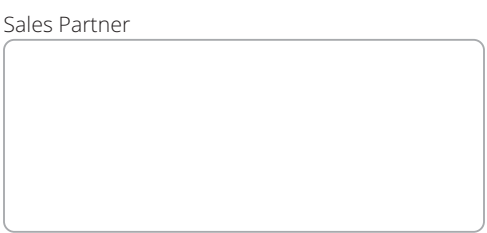
**Answer:** The market for EVA encapsulants in India is growing rapidly. This is due to the increasing demand for solar modules in the country. The market is expected to continue to grow in the coming years.

**Question:** What are the key factors that influence the performance of EVA encapsulants?

**Answer:** The key factors that influence the performance of EVA encapsulants are the quality of the raw materials, the manufacturing process, and the environmental conditions. The quality of the raw materials is crucial for ensuring that the encapsulant is able to provide the required level of protection for the solar cells.

**Question:** How do you see the future of EVA encapsulants in India?

**Answer:** I see a bright future for EVA encapsulants in India. The market is expected to continue to grow in the coming years, and this will create many opportunities for manufacturers and suppliers.



# Brij

## Crosslinked EVA Sheets

**Brij Encapsulants (India)**  
 28, Harsh Vihar, Pitampura, New Delhi - 110034, India  
 +91 95994 66291 | +91 98732 69403 | +91 92120 11038  
 www.brijencapsulants.com | sales@brijencapsulants.com  
 CIN : U19200DL2009PTC193603

Delhi | Gujarat | Telangana | MP | Haryana | UP  
 (A Unit of Brij Footcare Pvt. Ltd.)



\*Sales Partner enquiry solicited