

## TECHNICAL DATA SHEET: PROTEC EP Series

EVA encapsulant is an integral part of the solar PV modules which protects the solar cell from moisture, PID, environmental stress & also provide the required electrical insulation. **PROTEC** series EVA are resistant to PID, UV & weather. They are suitable to all crystalline and thin film solar PV modules. **PROTEC EP HT** is high transmission, transparent & PID resistant suitable to use as a front EVA. **PROTEC EP UV** is high UV resistant, transparent & PID resistant suitable to use as a Back EVA.

### Performance parameters

S. N	Parameter		unit	Test method	EP HT	EP UV
1	Thickness		µm	Micrometer	450 to 650 (±5%)	450 to 550 (±5%)
2	Weight		g/m <sup>2</sup>	Filmtec	390 to 560 (±5%)	390 to 473 (±5%)
3	Width		mm	Scale	Customization (+7/-0)	Customization (+7/-0)
4	Length		M/roll	Filmtec	150 & 400	150 & 400
5	Melting Range		°C	DSC	40-80	40-80
6	Gel content		%	Soxhlet	≥ 75	≥ 75
7	Thermal Shrinkage	MD	%	120 °C, 3 min	≤ 3	≤ 3
		TD	%		≤ 1.5	≤ 1.5
8	UV cut off wavelength		nm	ASTM E 424	---	360
9	Transmittance	1100 nm-380 nm	%	ASTM E 424	≥ 91	≥ 91
		380 nm-290 nm	%	ASTM E 424	≥ 80	≤ 30
10	Refractive Index			ISO 489	1.48	1.48
11	Adhesion Strength	Glass	N/cm	ASTM D 903	≥ 60	≥ 60
		Backsheet	N/cm	ASTM D 903	≥ 40	≥ 40
12	Tensile strength	MD	MPa	ASTM D 638	≥ 12MPa	≥ 12MPa
		TD	MPa	ASTM D 638	≥ 12MPa	≥ 12MPa
13	Elongation		%	ASTM D 638	≥ 500	≥ 500
14	Volume Resistivity		Ohm.m	ASTM D 257	≥ 1×10 <sup>15</sup>	≥ 1×10 <sup>15</sup>

### Lamination Recommendations:

Laminator configuration	Single stage	Multistage	Multi stack
Evacuation time (min)	<b>4-6</b>	<b>2-3</b>	<b>3-4</b>
Evacuation temp (°C)	<b>140-150</b>	<b>140-150</b>	<b>140-150</b>
1 <sup>st</sup> -Press time (min)	---	<b>1-3</b>	----
1 <sup>st</sup> -Press temp (°C)	----	<b>140-150</b>	<b>140-150</b>
Curing time (min)	<b>6-8</b>	<b>6-8</b>	<b>4-8</b>
Curing temp (°C)	<b>140-150</b>	<b>140-150</b>	<b>150-165</b>
<b>Temperature &amp; time are indicative to start with. Different make &amp; model of laminator behaves differently.</b>			

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**Storage conditions & Usage period:** Store unopened original packaging at storage temperature of 25°C to 30°C and storage humidity < 60% RH. Recommended to use within 6 months from date of manufacturing.

### Operational benefits

- State of the art highly precise automation from raw material pick up to finish roll packing
- Raw material from highly reputed manufacturers
- State of the art Laboratory having facility to check 100% raw material critical parameters
- Very clean manufacturing environment and premises

### Product Processing advantages

- Very robust process window for lamination, easy to set the lamination recipe.
- Suitable to conventional as well as all advanced lamination technologies, easy to run.
- Designed to match with all solar cell technology to yield max output
- Wrinkle & wave free flat sheet which prevents cell microcrack formation
- Both side embossing structure to give maximum solar cell visibility for defect inspection at pre lam stages
- Special surface texture to give optimum gripping to solar cell, glass & Backsheet to prevent any slippage of solar cell string during conveyor motion and layup movement

### Product technical advantages:

- Loaded with very stable PID resistance as well as UV resistance
- High Damp heat resistance up 3000 hours
- High light transmission for max power yield
- Compatible with all Backsheet types ( TPT, TPE, PPE, KPF, TPF, CPC etc)