CNCGLASS
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POE Encapsulant Film for Photovoltaic Modules

CNCGLASS offers this polyolefin (POE) encapsulant film, modified with the additives required for photovoltaic use, as a module packaging material alongside EVA film. It can encapsulate crystalline-silicon cells and thin-film cells. Low water-vapor passage, strong electrical insulation, and lasting resistance to potential-induced degradation are the points that set it apart, which is why it is a sound choice for cells that are sensitive to PID.



Figure 1. Close view of the POE encapsulant film surface.

1. Where This Film Is a Good Fit

The film is well suited to PID-sensitive designs such as P-type PERC bifacial cells, N-type PERT bifacial cells, and IBC cells. It is especially useful in frameless double-glass modules, and in single-glass modules that will operate in a humid climate. Water-vapor transmission is lower than that of a typical EVA encapsulant. PID resistance is held for a longer period. The film also stands up to heat, humidity, and ultraviolet light, stays stable with the other materials in the stack, and transmits enough light for the module to reach its designed power.

2. Two Optical Arrangements

Two optical arrangements are supplied. A high-transmittance, PID-resistant arrangement is placed toward the glass; ultraviolet passage in the 290–380 nm band is at least 80 %, which helps the module convert more of the incoming light. A high cut-off, PID-resistant arrangement is placed toward the backsheet; ultraviolet transmittance in the same band is no higher than 30 %, so the backsheet is shielded from ultraviolet damage and the module can last longer. In both cases, transmittance from 380 nm to 1,100 nm is at least 91 %.

Property	High-transmittance grade	High cut-off grade
Thickness (mm)	0.45–1.0	0.45–1.0
Width (mm)	Up to 1,400	Up to 1,400
Roll length (m)	150–350	150–350
Areal-density tolerance (%)	± 4	± 4
Density (g/cm³)	0.83–0.90	0.85–0.90
Degree of crosslinking (%)	≥ 75	≥ 75
Tensile strength (MPa)	≥ 6	≥ 6

Elongation (%)	≥ 500	≥ 500
Water absorption, 20 °C, 24 h	< 5.0	< 5.0
Peel strength to glass (N/cm)	≥ 60	≥ 60
Peel strength to the backsheet (N/cm)	≥ 40	≥ 40
Shrinkage, MD (%)	≤ 3.0	≤ 3.0
Shrinkage, TD (%)	≤ 1.5	≤ 1.5
Volume resistivity (Ω·cm)	≥ 1×10^{15}	≥ 1×10^{15}
Dielectric breakdown strength (kV/mm)	≥ 28	≥ 28
UV aging, ΔYI (120 kWh/m², 1,000 h)	< 5	< 5
Damp-heat aging, ΔYI (85 °C / 85 % RH, 1,000 h)	< 5	< 5
Transmittance, 380–1,100 nm (%)	≥ 91	≥ 91
Transmittance, 290–380 nm (%)	≥ 80	≤ 30

3. PID Check at 60 °C and 85 % Relative Humidity

A PID-resistant version of this POE encapsulant film has been checked in a 96-hour PID test at 60 °C and 85 % relative humidity. After the test, the current-voltage curve of the module was measured again, and the module was also reviewed by electroluminescence. The current-voltage results are given below. Maximum power (Pm) and fill factor (FF) were each retained at 99.60 %.

Condition	Isc (A)	Voc (V)	Pm (W)	FF (%)
As assembled	5.844	45.90	201.8	75.30
After 96 hours	5.853	45.80	201.0	75.00

Isc is the short-circuit current, Voc the open-circuit voltage, Pm the maximum output power, and FF the fill factor.

4. Lamination Guidance

The windows below may be used as a starting point on a single-chamber laminator and on a two-chamber laminator. Temperature and cycle times can be adjusted to the machine in use, as long as crosslinking remains inside the accepted range; for this POE encapsulant film, a value near 80 % is a practical target. Other materials in the stack should already have passed inspection by a recognized testing body for this industry.

Single-chamber cycle (both optical grades)

Item	Typical setting
Laminating temperature	145 ± 2 °C
Vacuum time	360 ± 30 s
Hold pressure, three stages	−75 / −45 / −20
Hold time	660–720 s

Two-chamber cycle (high-transmittance grade)

Item	Typical setting
First chamber temperature	120 ± 2 °C
First chamber vacuum time	360 ± 30 s
First chamber hold pressure, three stages	−70 / −50 / −20
First chamber hold time	180 ± 30 s
Second chamber temperature	145 ± 2 °C
Second chamber vacuum time	30 ± 10 s
Second chamber hold pressure, three stages	−70 / −50 / −30
Second chamber hold time	480 ± 30 s

The high cut-off grade follows the same two-chamber temperatures, vacuum times, and hold times. First-chamber hold pressures of −70 and −50, and second-chamber hold pressures of −70, −50, and −30, are the values stated for that grade.

5. Storage and Handling

Store the rolls in a cool, dry room kept at a steady climate, not above 30 °C and not above 60 % relative humidity. The film may be held for up to six months; it is better to use it within three months. The rolls are vacuum packed, and the usual inner pack length is 150–350 m per roll unless a different length is agreed. For long-term storage, do not stack more than four layers, so the film is not bent or flattened. Keep the film dry. After a pack is opened, or after the film is cut, it is best to use it within 48 hours. The module line should be kept free of unwanted static, which can otherwise disturb lamination.

Commercial Notes

Please contact CNC@CNCNEXT.COM for pricing, grade selection, widths and thicknesses, and packing details for this POE encapsulant film.

Contact Us

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We will be glad to advise on this POE encapsulant film, including the high-transmittance and high cut-off arrangements, for photovoltaic modules.