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High Cut-Off PID-Resistant EVA Encapsulant Film for Photovoltaic Modules

CNCGLASS supplies this EVA encapsulant film for photovoltaic modules that need a strong ultraviolet cut-off on the backsheet side of the stack, together with resistance to potential-induced degradation. The film is made from ethylene-vinyl acetate copolymer plus the additives required for module encapsulation. It seats and protects the cells, and it is laid toward the backsheet so that ultraviolet light is kept from reaching that sheet.



Figure 1. High cut-off EVA encapsulant film, shown unrolled.

1. Why a High Ultraviolet Cut-Off Is Used

In the 290–380 nm band, transmittance is no higher than 30 %. Placed against the backsheet, that cut-off limits ultraviolet damage to the sheet, so the sheet ages more slowly and the module can remain in service for longer. Across the 380–1,100 nm working band, transmittance is at least 91 %, so the useful part of the solar spectrum is still able to pass.

2. Bond, Weathering, and Line Performance

After aging, the peel strength is high enough for outdoor modules to remain free of delamination through 25 years in the field. The film stands up to high temperature, high humidity, and ultraviolet light, and it is PID-resistant. It is also stable in combination with the other components of the module. On the shop floor the film laminates readily, so cycle times can be kept short and the line can run at a steady pace.

Property	Value
Thickness	0.3–1.0 mm
Width	Up to 1,400 mm
Roll length	150–350 m
Areal-density tolerance	± 4 %
Density	0.95–0.96 g/cm³
Degree of crosslinking	≥ 75 %
Tensile strength	≥ 18 MPa
Elongation	≥ 500 %
Water absorption (20 °C, 24 h)	≤ 0.1 %

Peel strength to glass	≥ 60 N/cm
Peel strength to the backsheet	≥ 40 N/cm
Shrinkage, machine direction (MD)	≤ 3.0 %
Shrinkage, transverse direction (TD)	≤ 1.5 %
Volume resistivity	≥ 1×10^{15} Ω·cm
Dielectric breakdown strength	≥ 26 kV/mm
UV aging, ΔYI (120 kWh/m², 1,000 h)	≤ 4
Damp-heat aging, ΔYI (85 °C / 85 % RH, 1,000 h)	≤ 4
Transmittance, 380–1,100 nm	≥ 91 %
Transmittance, 290–380 nm	≤ 30 %

Lamination Guidance

The figures below are a starting window for a single-chamber laminator and for a two-chamber laminator. The temperature and the cycle times may be trimmed to suit the machine that is actually in use, provided the degree of crosslinking stays inside the accepted band; about 85 % is a practical target. Every other material in the stack should be a grade that has already passed inspection by a recognized testing body for this industry.

Single-chamber cycle

Item	Typical setting
Laminating temperature	142 ± 2 °C
Vacuum time	360 ± 60 s
Hold pressure, three stages	−70 / −45 / −20
Hold time	600–660 s

Two-chamber cycle

Item	Typical setting
First chamber temperature	122 ± 2 °C
First chamber vacuum time	360 ± 60 s
First chamber hold pressure, three stages	−70 / −45 / −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 / −45 / −20
Second chamber hold time	480 ± 60 s

Storage and Handling

Keep the rolls in a cool, dry room held at a steady climate: not above 30 °C and not above 60 % relative humidity. The film may be stored for up to six months; it is better to put it into production within three months. The rolls are vacuum packed. The usual inner pack length is 150–300 m per roll, unless a different length is agreed. For long-term storage, stack the rolls no higher than five layers, so that the film is not bent or crushed under its own weight. Do not allow the film to pick up moisture. Once a pack has been opened, or once the film has been cut, it is best to use it within 48 hours. Static charge can disturb lamination, so the whole module line should be kept free of unwanted static.

Commercial Notes

Please contact CNC@CNCNEXT.COM for pricing, available widths and thicknesses, and packing details for this high cut-off, PID-resistant EVA encapsulant film.

Contact Us

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We will be glad to advise on this high cut-off EVA encapsulant film for photovoltaic modules that need ultraviolet protection at the backsheet.