



Almaden[®] Polyolefin Encapsulant Films

Improving performance
to help lower total system costs

Almaden[®] Polyolefin Encapsulant Films from Changzhou Almaden Co., Ltd. can help module manufacturers reduce their total system costs and get powerful performance. Those using modules made with Almaden[®] films may gain added stability and reliability during operation, extending service life and generating increased value from their installations.

Almaden[®] Polyolefin Encapsulant Films are suitable for rigid modules that use crystalline silicon or thin film technologies. They are also suitable for many flexible module configurations. These advanced films are applicable for any scale residential, commercial, and utility installations.

Almaden[®] Polyolefin Encapsulant Films can protect photovoltaic modules better than ever to help further preserve and extend solar power production.

Almaden[®] Polyolefin Encapsulant Films performance is very balanced in all aspects such as Water Vapor Transmission Rate (WVTR), temperature resistance and volume resistivity. Almaden also can custom the film formulations that are designed to address customer needs.

Almaden® Polyolefin Encapsulant Films

Typical Physical Properties

Optical Transmission	>90%
Ultimate Elongation	>700%
Ultimate Tensile Strength	10 MPa
Refractive Index	1.475
Glass Transition Temp (T _g)	-50°C
Volume Resistivity	≥8.0 x 10 ¹⁵ Ohm-cm
Adhesion to Glass	>10 N/mm
Water absorbing rate	<0.01%
Density	0.88 g/cm ³
Crosslinking	>70% ⁽¹⁾

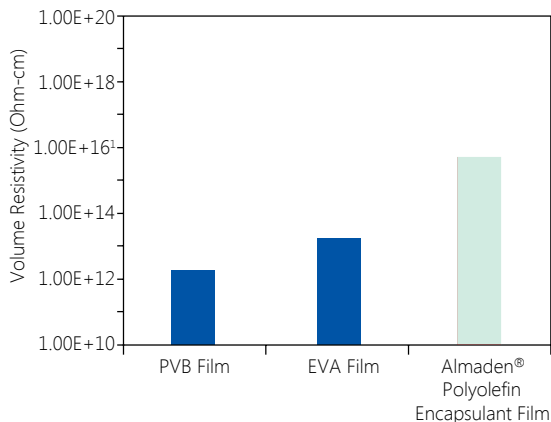
(1). Hot plate temperature 150°C, Process Time 21 minutes.

Water Vapor Transmission Rates, Almaden® Polyolefin Encapsulant Film vs. EVA Film and PVB Film

Sample	WVTR @ 38°C
Almaden® Polyolefin Encapsulant Film	3.3
EVA Film	34
PVB Film	84

All WVTR units are in g/(m²/24 hrs) measured at 100% RH, average of two specimens.

Volume Resistivity, Almaden® Polyolefin Encapsulant Film vs. EVA Film and PVB Film



Moisture Resistance Allows Long-Lasting Protection

The structure of Almaden® films allows them to help modules resist moisture damage caused by absorption, corrosion, or delamination. Also Almaden® films have an excellent lower Water Vapor Transmission Rate (WVTR) than EVA or PVB. The WVTR of Almaden® films can be 10-20x lower than that of EVA or PVB films. This great ability makes Almaden® Films offer high levels of long-lasting protection.

Great Properties Help Improve Electrical Performance

The Volume Resistivity levels of Almaden® Films are very high when compared to EVA films and PVB films. PV modules using Almaden® Polyolefin Encapsulant Films have more than 50% reduction in leakage current compared to some EVA films. This can help enhance electrical performance, reduce the effects of potential induced degradation (PID), and further extend service life.

Improving Efficiency and Enduring Power

Almaden® films have ability to provide optimal power output. They have a comparable level of Optical Transmission to EVA films. The refractive index of Almaden® films is very close to that of glass, reducing refractive losses off of the glass-polymer interface and maximizing light transmission to the cell. This has a very positive effect on overall power generation and preservation.

Excellent Stability Can Help Extend Service Life

Modules made with Almaden® films show excellent stability in various environments. These modules have passed demanding weathering tests while exposed to harsh environment such as thermal fatigue, rain, hail, and wind. Even after 10,000 hours of Xenon Arc weathering testing, Almaden Films did not show an increased yellowness index (a problem often associated with EVA). Such excellent stability in extreme use conditions can help extend service life.