

Evergreen Solar® improves junction box using Dow Corning® PV-7010 Potting Agent

Case Study: Evergreen Solar



Photo courtesy of Evergreen Solar. AV13060

CUSTOMER

Evergreen Solar

LOCATION

Marlboro, Massachusetts
United States

PROBLEM

Evergreen Solar wanted to reduce junction box size and improve electrical safety and by-pass diode cooling performance in an effort to cut costs.

PRODUCT SELECTED

Dow Corning PV-7010 Potting Agent

RESULTS

Evergreen Solar used *Dow Corning* PV-7010 Potting Agent to allow optimal by-pass diode cooling, as well as very good protection against environmental ingress. The gel also offers strong adhesion without primers, good dielectrics and thermal conductivity, fast or ultrafast cure, a UL-94 V1 fire resistance rating, and easy visual inspection.

New junction box design uses cost-cutting dielectric tough gel to substantially improve durability and performance.

When Evergreen Solar, an innovative manufacturer of photovoltaic (PV) modules using patented *String Ribbon™* technology, began looking for ways to reduce module costs, redesigning the junction box became a potential solution.

While redesigning a junction box may not be the first thing that comes to mind, it can actually deliver substantial benefits, as the cost of this critical reliability component is significant—and its durability and performance vital to customer satisfaction.

Evergreen Solar had traditionally offered modules with large, general-purpose junction boxes well suited to the off-grid market. But as the on-grid market grew dominant, the company began to evaluate whether a smaller junction box could lower costs without sacrificing durability and performance. Researchers discovered that, while the larger junction boxes had

sufficient air space to enable diode cooling, the smaller boxes presented heat transfer challenges. That's when Evergreen Solar approached Dow Corning's solar team.

"Dow Corning immediately came up with several alternative options that they discussed with us," said Christine Bordonaro, product development manager at Evergreen Solar. "They focused on understanding our needs and came back with a recommendation that exceeded our

expectations. What Dow Corning's solar team brought to us was the kind of expertise and behaviors we want suppliers to offer to a PV producer. They take time to listen and understand your needs."

Dow Corning also recognized Evergreen Solar's need to continuously bring down PV module costs

to make clean, renewable PV electricity competitive with electricity derived from traditional fossil fuel sources such as oil, coal or gas.

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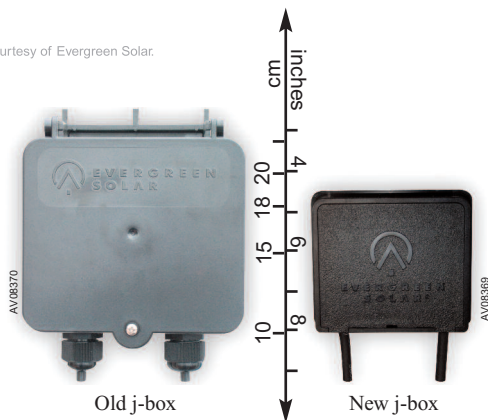
CHRISTINE BORDONARO
EVERGREEN SOLAR PRODUCT
DEVELOPMENT MANAGER

Dow Corning PV-7010 Potting Agent: Meeting the needs of tomorrow's solar PV modules

THE RIGHT SOLUTION FOR THE JOB

A typical by-pass diode transfers heat via the convection/conduction/radiation process. During a reverse current, the diode will conduct and begin to heat. This heat flows to colder parts of the system by convection, conduction and radiation. Ultimately, the heat passes to the surrounding air by convection and radiation. If the heat transfer cannot dissipate enough heat in the junction box, the diode could fail. Proposed changes to the PV module standard require that the temperature within the junction box not reach the diode's failure point, and also ensure a factor of safety.

Photo courtesy of Evergreen Solar.



When approached by Evergreen Solar regarding its smaller junction box design, Dow Corning recommended using *Dow Corning PV-7010 Potting Agent* to allow for optimal by-pass diode cooling, as well as very good protection against environmental ingress. The two-part translucent gel offers strong adhesion without primers, good dielectrics and thermal conductivity, fast or ultrafast cure (cure accelerated by heated dispensing), a UL-94 V1 fire resistance rating and easy visual inspection.

With the help of Dow Corning and other supplier partners, Evergreen Solar significantly cut its total junction box costs, while ensuring optimal diode durability and performance. Dow Corning also recommended proven dispensing solutions to help increase throughput, improve reliability and further decrease costs through process automation.

“Dow Corning did not stop after demonstrating their material’s high performance in the application. They worked to find a complete solution for us,” said Bordonaro. “To optimize throughput and lower costs, especially in a fast-growing company, process automation is an important consideration. So they got involved with dispensing equipment partners for the project.”

“Throughout this project, we’ve worked with people located in the U.S. and Europe seamlessly—from sales and technical service to customer service functions,” said Bordonaro. “It is very easy to work with Dow Corning. They move fast and stay focused on getting the job done right.”

LEARN MORE

Dow Corning has sales offices and manufacturing sites, as well as science and technology laboratories, around the globe. For more information, please visit dowcorning.com/solar or e-mail solar.solutions@dowcorning.com.

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