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DUPONT™ PV5300 SERIES CASE STUDY

Advanced encapsulant helps create new, building-integrated photovoltaic (BIPV) roofing

Using DuPont™ PV5300 Series ionomer-based encapsulant, Italian manufacturer SYSTEM Photonics S.p.A. offers its "ROOF Collection" solar tiles, an elegant new choice for adding attractive built-in photovoltaic (BIPV) power generation when roofing or reroofing.

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Up to 100 times stiffer than traditional encapsulant sheets, DuPont™ PV5300 Series ionomer-based sheets helped System Photonics engineer a strong, well-protected power generating module that's designed to withstand rooftop foot traffic.

Recently commercialized building-integrated photovoltaic (BIPV) roofing tiles from Italy are the first to take advantage of new ionomer-based encapsulant sheets from DuPont Photovoltaic Solutions

SYSTEM Photonics S.p.A. from Italy calls its new "ROOF Collection" BIPV solar tiles an elegant new choice for adding aesthetically appealing, built-in photovoltaic power generation when roofing or reroofing.

The "ROOF Collection" solar tiles use new DuPont™ PV5300 Series encapsulant to improve module strength, durability and cost-per-watt efficiency. The BIPV roofing tiles are manufactured for easy installation and long-lasting power production.

"Our technical focus is crystalline silicon based photovoltaic power generation, in durable roofing tiles that mount directly to the structural framing," said System Photonics CEO Gianluca Aiazzi. "Because it's a high- volume application, our strategy was to reduce module labor costs through advanced automation, and then seek further cost-per-watt efficiencies and module manufacturing advantages through ongoing materials science."

System Photonics' roofing tiles feature power generating cells embedded between two 35-mil sheets of clear, strong ionomer encapsulant, mounted onto individual ceramic tiles about 1 meter wide. The BIPV roofing tiles are topped with low-iron glass, also held in place by the new encapsulant. The completed assembly is pressed together and heat-sealed using automated vacuum laminators with robotic feeds. The new ionomer-based encapsulant has been instrumental in designing the manufacturing process for speed, reliability and efficiency.

Attilio Russo, chief technology officer for System Photonics, guided development of the new design after discovering a stiffer safety glass interlayer product called DuPont™ SentryGlas®. Follow up discussions with DuPont identified that similar benefits could be gained in photovoltaics from using DuPont™ PV5300 encapsulant sheets, which are 5 times tougher and up to 100 times stiffer than the PVB and EVA sheets more commonly used as encapsulants.

CASE STUDY: SYSTEM PHOTONICS, S.P.A. "ROOF COLLECTION" SOLAR ROOFING TILES

"We needed a material that could add to module strength and support automated sheet handling equipment," explains Russo. "The encapsulant needed to be easily managed and aligned across all steps of the production process. Other encapsulant sheets were too floppy and elastic, making them hard to handle; so we immediately saw production speed advantages with the ionomer sheet."

System Photonics designed its "ROOF Collection" tiles with open, frameless edges for architectural elegance and simplicity. "Compared with other encapsulants we tested, the stiffer ionomer sheet also made modules more impact-resistant and much more durable in weather-exposed open edges," notes Russo.

The frameless roofing tiles are offered in 13 attractive colors, selected for residential architectural appeal. System Photonics plans to continue its advance of BIPV technology by developing lighter modules with thinner sun-facing materials, relying further on the structural and impact strength of the new encapsulant.

DuPont™ PV5300 Series Encapsulants are part of a broad and growing portfolio of products represented by DuPont Photovoltaic Solutions, which connects science and technology from across the company on a global scale to help support the dramatic growth in the photovoltaic industry.

Sun isn't the only weather in which new "ROOF Collection" solar tiles excel. Use of DuPont™ PV5300 ionomer-based encapsulant also allows for open-edged tile design, helping create an elegant appearance and superior resistance to moisture ingress.

With building-integrated photovoltaic (BIPV) roofing tiles, modules that generate electricity are blended into the roof, not just added on. System Photonics makes its solar tiles in 13 colors for aesthetic integration with a wide variety of roofing schemes.

After a recent earthquake in Abruzzo, Italy, school officials in Pizzoli Village (near L'Aquila) decided to rebuild using solar roofing tiles from System Photonics, S.p.A, helping their rooftops deliver clean energy for a reduced environmental footprint and lower energy bills.

For more information about next-generation encapsulants or other DuPont Photovoltaic Solutions:

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