

Solstice[®] Shingle

PRODUCT OVERVIEW

A Guide for Building Commissioners and
other Authorities Having Jurisdiction



Introduction

In June 2023, CertainTeed LLC released a new building integrated photovoltaic (BIPV) product for residential roofing called Solstice® Shingle. BIPV roofing products differ from traditional solar modules in that they are considered part of the roof covering, not a component and cladding, and are therefore subject to meeting building code requirements.

Solstice® Shingle is the culmination of years of research and development to provide a product for the American consumer which will generate clean energy while maintaining the beautiful aesthetics of the roof. Safety is CertainTeed's most important core value, and considerations to guarantee the safe operation of the product for its entire lifetime was engineered into the product. Solstice® Shingle has undergone rigorous testing to confirm it complies with building codes, material standards, and electrical safety codes.



Figure 1: Solstice® Shingle Photovoltaic Shingle

Installation

Installation of the Solstice® Shingle product is made only by credentialed installers who have received training from CertainTeed to ensure the safe handling and installation of the product. Attachment and installation is made per the CertainTeed LLC Solstice® Shingle Installation Manual.

Roof Deck Requirements

The Solstice® Shingle product is only for new home construction or re-roofing projects; it is not for installation on top of existing roofing coverings. Traditional asphalt shingles with mounting equipment and solar modules can weigh 3.5-5 pounds per square foot, and in comparison, the Solstice® Shingle product only weighs 2.3 pounds per square foot.

Solstice® Shingle is designed to be installed on pitched roofs with slopes of 2:12 or greater.

The roof deck must be a minimum of 15/32" veneer plywood, 7/16" non-veneer APA rated sheathing panel (oriented strand board panels, structural particleboard panels, composite panels or wafer-board panels) or 3/4" thick wood sheathing boards.

For High Velocity Hurricane Zone (HVHZ) areas the roof deck must be a minimum of 19/32" CD exposure 1 plywood or equivalent.

The underlayment specified to be applied under the photovoltaic shingles is GRACE ICE AND WATER SHIELD® HT, which complies with ASTM D1970; and this system provides a Class C fire resistant roof. An additional layer of MgO boards is required to achieve a Class A fire resistant roof, if desired.

Solstice® Shingle System Overview

Photovoltaic Shingles

One photovoltaic shingle consists of 14 photovoltaic cells encapsulated with a glass top, such as with standard photovoltaic modules, and fixed to a durable resin frame. Each shingle produces 70 Watts of power.

After the underlayment is secured, the bottom row of metal flashings and a starter strip is installed, then the first row of photovoltaic shingles, with their bottoms locking into the starter strips. The top of the photovoltaic frame is attached to the roof with 5 screws. Shingles are locked together with 3 stainless-steel wind clips, which are placed on the top of each photovoltaic shingle frame and hold the bottom of the photovoltaic shingle above it in place.

Flashing

After the array of photovoltaic shingles is installed, additional resin flashings are installed around the photovoltaic shingles. The flashings are specially designed to cover the edges of the shingles and divert water into a washout away from the PV array.

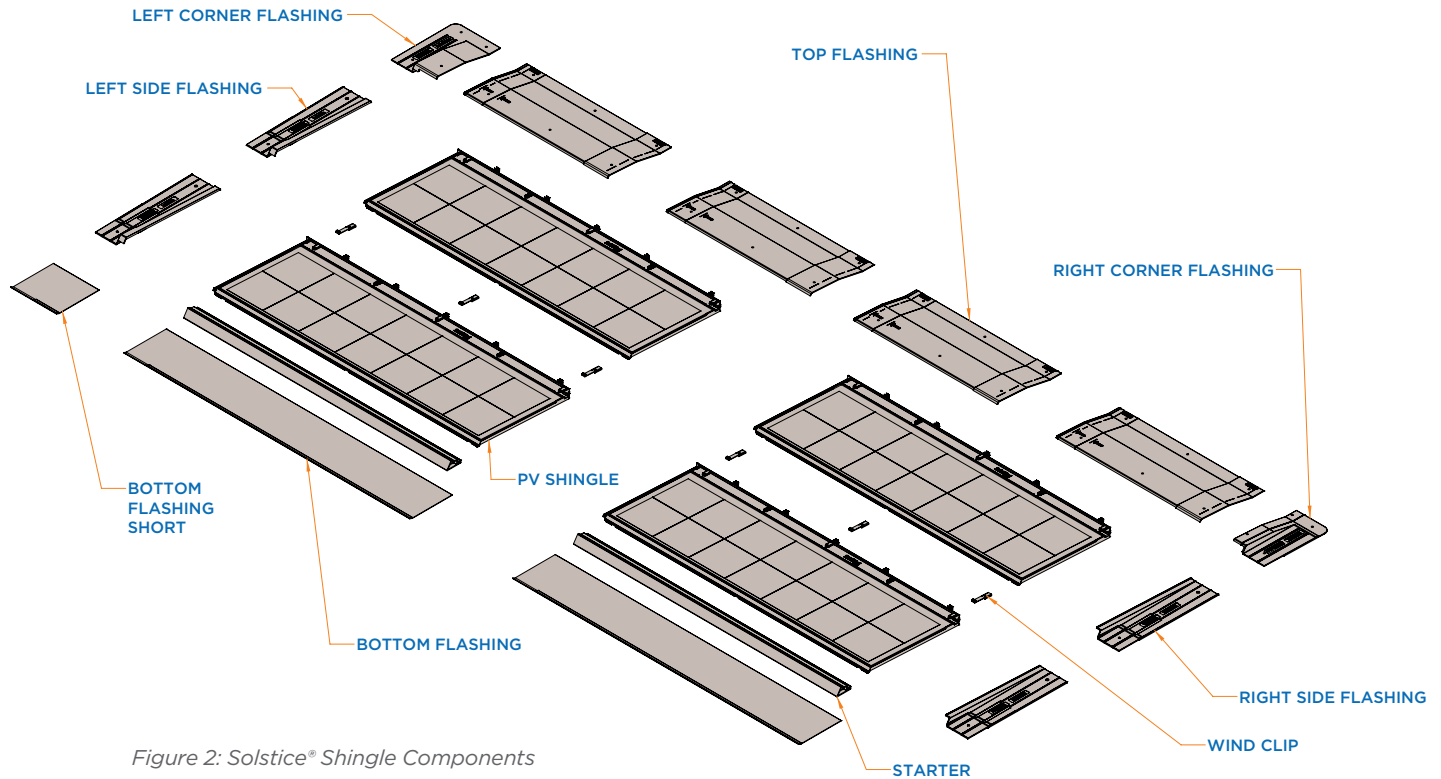


Figure 2: Solstice® Shingle Components

Wiring and Electronics

Photovoltaic shingle electrical wires are connected in series, with a simple male to female fitting. The back side of the photovoltaic shingle has an ample gap for wiring to be safely maintained into permanent wire clips that are manufactured into the resin frame. A 1 5/8" hole is made into the roof deck for the homerun wires to be inserted into the attic and then the hole is appropriately covered with flashing. A qualified electrician will install the wires and conduit from the attic space to an industry standard inverter located at ground floor level located per the permit package.

A rapid shutdown device manufactured by Midnite Solar will be installed near the location where conductors enter the building to meet NEC 690.12 standards. The rapid shutdown device ensures the safety of firefighters who may be working on the roof by reducing the voltage on the roof to safe levels when activated. The rapid shutdown device is designed for string-level installation (compliant with NEC 2014), as well as module-level installation (compliant with NEC 2017 and 2020). In order to comply with NEC 2023, the receiver must be installed within 1 foot of the array and paired with an inverter as specified per the UL3741 Solstice® Shingle Photovoltaic Hazard Control System (PVHCS) Manual. Once the DC conductors enter the building, they will be protected as per NEC 690.31(D) and grounded as per NEC 250.118(10).

Asphalt Shingles

CertainTeed asphalt shingles are installed around the photovoltaic array perimeter per the asphalt shingle installation manual. Any line of CertainTeed asphalt shingle can be used, all of which are certified to ASTM D3462. Asphalt shingles will be selected with a fire rating to match that of the Solstice® Shingle BIPV system.

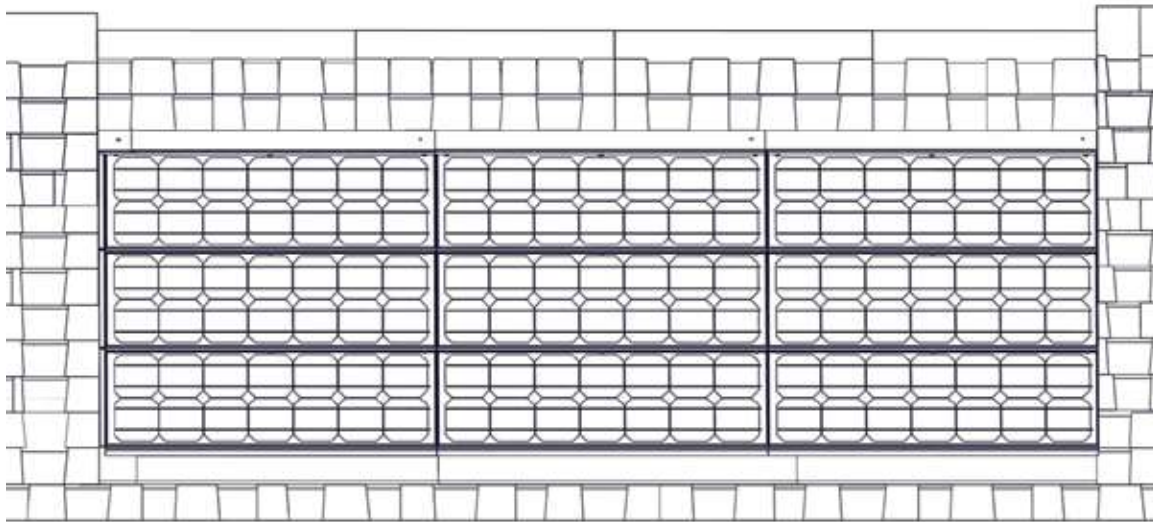


Figure 3: Illustrated example of completed Solstice® Shingle installation surrounded by asphalt shingles.

Building Code Compliance

The Solstice® Shingle system has been evaluated by Intertek to comply with the following:

- 2021 and 2018 International Building Code (IBC)
- 2021 and 2018 International Residential Code (IRC)
- 2020 Florida Building Code (FBC), including High Velocity Hurricane Zone (HVHZ)
- FL Product #42164

Intertek issued a Code and Compliance Research Report (CCRR-0501) summarizing compliance of the Solstice Shingle to the above codes.

Intertek is an independent entity accredited to ISO 17065 (formerly ISO Guide 65) by the International Accreditation Service (IAS). Intertek's code evaluation program is compliant with Section 1703 of the International Building Code, which outlines requirements for an issuing agency of code reports.

Testing Compliance

The Solstice® Shingle product has been tested at ISO 17025 accredited laboratories and complies with the following:

Performance Characteristic	Test Standard	Classification
Material Standards	UL 7103; UL 61730-1; UL 61730-2	Compliant
Fire Classification	UL 790	Class C Class A when installed with additional FR underlayment per installation manual
Wind-driven Rain	TAS 100	Compliant
Wind Resistance	ASTM D3161	Class F (110 mph)
Impact Resistance	FM4473	Class 3 (1.75" hail)
Photovoltaic Hazard Control	2023 NEC 690.12 (UL 3741)	Compliant*

*testing in progress



Quality Assurance

Solstice® Shingle will be listed and labeled with Intertek (an OSHA Nationally Recognized Testing Laboratory (NRTL)) to meet the BIPV safety standards per UL 7103, UL 61730-1 and UL 61730-2 and the photovoltaic shingle label bears their certification mark. Listing with Intertek ensures that the Solstice® Shingle product will continue to meet standards and code requirements through unannounced manufacturing plant audits to confirm conformance.

For Further Information

CertainTeed stands behind the safety and quality of the Solstice® Shingle product and its installation with a best in class 25 year warranty. For more information on Solstice® Shingle call **1-800-233-8990** or go to **[www.certainteed.com/solar/products/Solstice\(r\)-shingle](http://www.certainteed.com/solar/products/Solstice(r)-shingle)**