CIGS MODULES & BIPV

HIGH-PERFORMANCE CIGS THIN-FILM SOLAR MODULES AND BUILDING-INTEGRATED PHOTOVOLTAICS FROM THE CIGSinnoline
# CIGS Thin-Film Solar Modules

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CIGS thin-film technology is based on a razor-thin conductive layer of copper, indium, gallium, and selenium. According to experts, it is the solar technology that currently has the greatest potential and offers compelling advantages over both other thin-film technologies and crystalline silicon solar cells.

**Sustainable Production**
One benefit is already exhibited during production – namely the low amount of material required. While present-day crystalline cells are around 200 µm thick, the CIGS absorber is less than 2 µm thick. This saves material during production and is sustainable and environmentally friendly.

**Maximum efficiency**
CIGS modules offer superior efficiency compared to other thin-film technologies. High-performance modules based on CIGS technology can already match the efficiency of multi-crystalline solar modules.

**An architectonic highlight – the facade integration**
CIGS modules are very well suited for integration in building facades, thus for vertical installation. They impress with their modern and aesthetical design.

**Excellent temperature coefficient**
The low temperature coefficient of CIGS modules compared to crystalline solar modules provides for an excellent energy yield at higher module temperatures.

**Quality Made in Germany**
Manz’s aesthetically sophisticated CIGS solar modules are manufactured on the Manz CIGSinnoline at our facility in Schwäbisch Hall, using the latest high-tech systems in adherence with strict quality standards.
Together with our partners, Manz can draw from 35 years of experience when it comes to CIGS technology. One milestone in the technology’s development was the first pilot line for CIGS modules built by the Center for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW) in 1995. Five years later, the first pilot line for modules measuring 1,200 × 600 mm came into operation – a predecessor of the later CIGS production line from Würth Solar, which was used to produce a solar module with an aperture efficiency of 15.9 % in the summer of 2012, breaking all previous world records. In early 2012, the production line was acquired by Manz together with 118 employees and the rights to the CIGS technology, and was converted into an innovation line. And since then, Manz has produced high-performance CIGS solar modules on its CIGSinnoline.

Guaranteed Quality
The conversion of the production line into an innovation line with an output of 6 MWp/a and the use of newly developed high-tech systems from Manz guarantee solar modules with the highest degree of efficiency that are inspected and tested with a particular focus on quality.

Efficient Production Processes for Affordable Module Prices
Thanks to efficient production processes, cost-cutting potentials that have a direct impact on the price of Manz’s CIGS solar modules can already be tapped during production.
Benefits of Facade Integration
The integration of CIGS solar modules into building facades offers benefits when constructing new buildings or reconstructing existing buildings. The solar modules replace the conventional facade and in addition to generating electricity they also protect the facade from weathering.

Manz has unparalleled expertise in the integration of CIGS solar modules into building facades. For construction and production processes of building-integrated solar modules we follow the technical regulations for buildings.

Sustainability
The term “Energy Payback Time” describes the amount of time a system needs to produce the amount of energy that was required to produce the system in the first place. Measuring approximately one year, Manz CIGS modules have a significantly shorter energy payback time than crystalline silicon solar modules. In addition, the efficient production process on the CIGS\textit{innoline} and the minimal use of materials saves resources over the long term.

For a clean environment tomorrow – CIGS solar modules from Manz.
Building-integrated CIGS solar modules in standard size on different facades

**STANDARD MODULES**

- **Standard module with one junction box**
- **Model with or without frame**
- **Certified by TÜV Rheinland according to IEC 61646 and IEC 61730**
Building-integrated CIGS solar modules in customized format – cooperation project with Sto AG

**MODULES WITH CUSTOMIZED FORMAT**

4-fold element

Variable sizes possible by cutting and multiple elements, max. size 4.2 × 2.4 m

More information on system solutions for building-integrated photovoltaics (BIPV)