Heavy pressure loading of photovoltaic glass

Overview

As the PV industry considers new cell and module designs of lower cost, the reliability and durability become a major issue. Hence, it is important to evaluate the influencing factors on the mechanical strengt.

Does glass superstrate provide mechanical rigidity of PV modules?

The glass superstrate provides the mechanical rigidity of the PV module since it comprises more than 72% of the module thickness and has a high mechanical stiffness of E = 73 GPa, which governs the deflection of the whole module. Fig. 19 shows the deflection across the PV module diagonal for PV modules with different glass stiffness.

Why do PV modules need a homogeneous mechanical load?

Various mechanical stresses can arise in PV modules due to manufacturing processes, transportation, handling during installation, wind, hail, snow, and thermo-mechanical loads. Numerous studies investigate a homogeneous mechanical load according to IEC 61215 which is crucial for the development of novel module designs.

Why is the thickness of a PV module important?

The thickness and the position of each material in the PV module are crucial for the reliability of the structure. The glass which is used as a front cover material, is the thickest part of the PV module. It is strong under compressive loading conditions and provides the mechanical rigidity of the entire structure.

What are the optimal design parameters for a glass-glass PV module?

This study finds the optimal design parameters of the support structure consisting of two C-Chanel that support the Glass-Glass PV module having thin glass on top and SLG at the bottom. Based on analysis described here, it was found that optimal channel location from free edges is close to L/5 that gives mechanical reliability of 0.99.

Does Si thickness affect the mechanical strength of PV modules?

The results showed that the Si thickness can play a critical role in the mechanical strength of PV modules. Although the Si thickness has a minor effect on the deflection of the PV module, the developed stresses increase significantly when the thickness is reduced.

What type of glass is used for a voltaic module?

voltaic module covers and thin-film module substrates and superstrates. Typically this application uses tandard or low-iron soda-lime-silica float glass with thickness 3.2 mm. Here we consider a specialty thin glass as ei er the substrate or superstrate of a dual-glass laminated TF PV module. A standard tempered 3.2 mm soda-lime-si

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For Forward and Reverse wind load cases, the magnitude of the pressure load used was 2400 Pa, while, for Heavy wind load case, pressure magnitude of 5400 Pa was used (IEC 61646 ...

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