Information on the „overhead installation“ of our double glass modules

Glass in building - Pendulum impact test (EN12600:2003)

Test according to the European standard EN12600 successfully passed
Competitors claim an alleged ***„overhead certification“*** as a sales argument for the use of their modules in building-integrated applications. **As we have received official confirmation, there is no basic certification process for photovoltaic modules for overhead approval.**

Essential, however, is the safety against falling splinters in the event of a breakthrough.
This protection against injuries caused by glass breakage is provided by our modules. The effective protection against violent breakage is based on a combination of glass and the laminate as a viscoplastic intermediate layer.

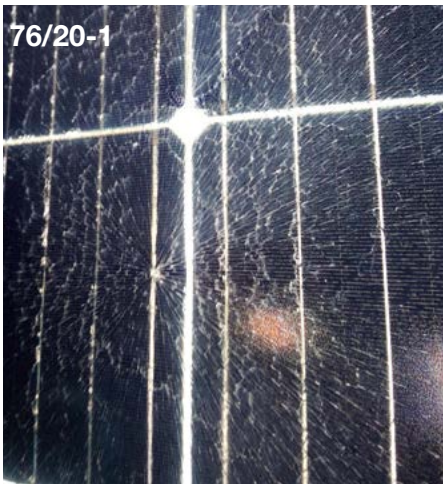
For testing such glass-glass laminates there is the European standard EN12600 (Glass in building - Pendulum impact test). This is a method for impact testing and classification of flat glass. This standard can also be applied analogously for laminated double glass modules. Our double glass modules are manufactured as laminated glazing with embedded crystalline solar cells, whereby the film used ensures inherent stability in the event of glass breakage. As a result, the modules meet the **building regulations requirements** for overhead glazing, i.e. they are protected against the falling of larger fragments in the event of glass breakage. Our modules were tested according to the EN12600 standard in an accredited institute. The test was so successful that it could be stopped already after the break-through test of a part of the modules.

Three critical properties are tested for overhead approval:
1. Splinter binding: even in case of destruction of the panes, no sharp glass splinters must fall out.
2. Penetration resistance
3. Residual load-bearing capacity: the overhead glazing must have a high resistance to occurring loads and still have a minimum load-bearing capacity even if damaged.

Test results:

Object no.	Pendulum drop height (mm)		
	190	450	1200
76/20-1	No breakage	No breakage	Fracture according to STN EN12600:2003, section 4a); numerous cracks, no particles
76/20-2	No breakage	No breakage	Fracture according to STN EN12600:2003, section 4a); Mass of particles: 3.9 g
76/20-3	No breakage	No breakage	Fracture according to STN EN12600:2003, section 4a); mass of particles: 6.96 g; maximum opening width: 27 mm
76/20-4	No breakage	No breakage	No breakage
Classification: 1 (B) 1			
Note:	The test objects were aligned so that the electrical connection components (junction boxes) were not on the impact surface of the photovoltaic module during the tests. The classification applies to installations where there is a risk of impact from both sides of the photovoltaic module. The type of breakage is typical for laminated glass.		

Original test pictures:



The GridParity modules have passed all tests with excellence. Not a single module was massively damaged or even penetrated as the photos show.The modules may therefore be used for overhead glazing, facade installations and as balcony modules. This results in a wide range of applications from terraces to carports, large-scale parking lot roofing, roofing of industrial halls to sports facility roofing.

What are the additional advantages of GridParity double glass modules?
In our double glass modules, the solar cells are arranged between two glass panes. Thus, the cells lie in the neutral fiber and are not stressed when the module deflects. In addition, the glass plate on the back provides much better stability so that even thin glass of 2mm and less can be used. Our glass-glass modules are durable and extremely robust against any weather conditions. At the same time they are as light as conventional modules and easy to install. The advantage of glass-glass modules is the material: glass hardly ages. It offers the best protection for solar cells and ensures that your modules will still be particularly powerful in decades to come. Here again all the product advantages of glass-glass modules:

- Light weight due to 2 mm thin glass
- Highest mechanical load capacity
- Protection against PID (voltage-induced power drop)
- 30 years linear performance guarantee.

Price and performance speak for GridParity glass-glass modules
When comparing glass-glass with glass-foil modules, the costs over the entire service life must be considered. It is also important how much energy a module delivers during this time. Photovoltaic system operators get a high-performance product with glass-glass modules that lasts much longer than glass-foil modules. That is, for almost the same price and longer life, the glass-glass solar module produces much more solar power.

Our high-quality double-glass modules are optimally suited for use on carports, terraces or roofs due to their stability and safety. Find out more about our PV kits at www.gridparity.ag .

Karlsfeld, 25th of Ocotber 2021 Dr. Erich Merkle, CEO of GridParity AG

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