FIXING SYSTEMS

Energy5

FOR PHOTOVOLTAIC MODULES

FREESTANDING **SYSTEMS**

ROOF **SYSTEMS**

AUTOBOX **SYSTEMS**

FAÇADE **SYSTEMS**

NEW

PHOTOVOLTAIC TRACKER

A single-axle system following the sun,
designated for large area farms!

The energy yield increased by ca. 30%!

About the company

Experience and knowledge

We have come a long way since establishing of Energy5. We were a small local company, and have become an international manufacturer and supplier of fixing systems for photovoltaic modules. Our team consists of **experienced engineers, operators** and **specialists**, representing many different professional specialisations.

Extensive range

Our range include complete **freestanding and roof systems, freestanding systems for parking places (AUTOBOX), and façade systems.** For our customers, we ensure comprehensive designing of photovoltaic systems and an extensive range of consulting and technical services. We cover all stages of the investment process, and you can count on cooperation with our experts having professional knowledge.

Individual approach

We set new trends, and continuously seek new and impressive solutions, so we can deliver to the market the safest fixing systems for photovoltaic modules. **We also execute special structures, dedicated to a specific project**. We are distinguish by developing each system individually, with a support of well-qualified engineers, so each design is optimised in terms of a layout of modules.

Tested solutions

The advantages of our products are their quality and safety, confirmed by a document of the National Technical Assessment issued, for the first time in Poland, by the Building Research Institute. We create ready to use fixing systems for photovoltaic modules, testing all connecting elements. The conducted tests confirm the declared level of performance characteristics.

individual
designs of structures

an extensive range
of consulting and technical services

product certified
by the Building Research Institute

systems resistant
to corrosion with the metallic coat Magnelis®

Modern
MACHINE POOL

We have our own machine pool equipped with six independent production lines from leading manufactures.

Using our machines, we manufacture all construction designs, consisting of the fixing systems for photovoltaic modules.

With the fully automated machine pool we can optimise production and increase flexibility in taking new challenges.

The extensive experience of our engineers and the use of innovative technologies translates into execution of many unconventional projects that are not found anywhere in the market.

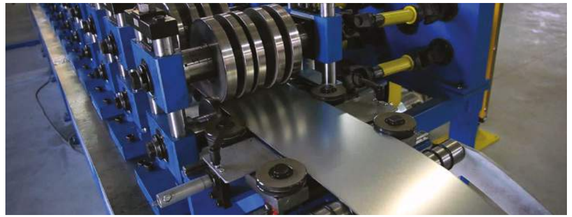
Comprehensive studies

To ensure the required safety in use, **we create ready to use fixing systems for photovoltaic modules**, testing all connecting elements in the set. The conducted tests confirm the declared level of performance characteristics, required by law for construction products of this type.

The highest standard

With our **experience, innovative technology** and c**ooperation with leading research** and **scientific centres,** our products meet the highest standards, while they maintain certificates, standards and approvals required by the Polish law.

The production process is monitored by the Plant Production Control, certified by the Building Research Institute.



Tests
AND CERTIFICATES

- **Energy5 systems hold the National Technical Assessment issued by the Building Research Institute.**

- **The Energy5 systems hold the National Technical Assessment for the Plant Control System, issued by the Building Research Institute.**

The documents listed above authorise us to putting the products into the market and be used in the building industry in the national market and mark it with a construction mark B.

INSTYTUT TECHNIKI BUDOWLANEJ
PL 00-611 WARSZAWA, ul. Filtrowa 1, www.itb.pl

CZŁONEK EOTA I UEAtc

KRAJOWA OCENA TECHNICZNA
ITB-KOT-2018/0109 wydanie 1

Niniejsza Krajowa Ocena Techniczna została wydana zgodnie z Rozporządzeniem Ministra Infrastruktury i Budownictwa z dnia 17 listopada 2016 r. w sprawie krajowych ocen technicznych (Dz. U. z 2016 r., poz. 1968) przez Instytut Techniki Budowlanej w Warszawie, na wniosek firmy:

Energy 5 Sp. z o.o.
ul. Ziejkowa 5, 09-500 Gostynin

Krajowa Ocena Techniczna ITB-KOT-2018/0109 wydanie 1 stanowi pozytywną ocenę właściwości użytkowych poniższych wyrobów budowlanych do zamierzonego zastosowania:

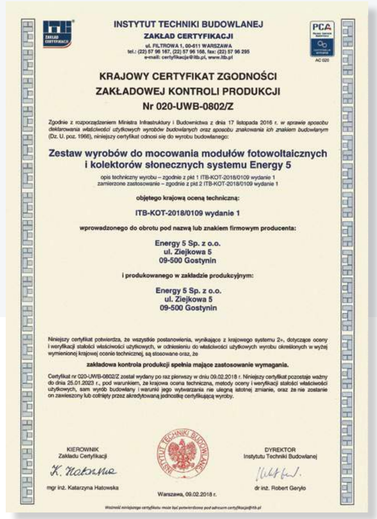
Zestawy wyrobów do mocowania modułów fotowoltaicznych i kolektorów słonecznych systemu ENERGY5

Data ważności Krajowej Oceny Technicznej:
25 stycznia 2023 r.

DYREKTOR
Instytutu Techniki Budowlanej
dr inż. Robert Geryło

Warszawa, 25 stycznia 2018 r.

Dokument Krajowej Oceny Technicznej ITB-KOT-2018/0109 wydanie 1 zawiera 70 stron, w tym 4 załączniki. Tekst tego dokumentu, można kopiować tylko w całości. Publikowanie lub upowszechnianie w każdej innej formie fragmentów takiego Krajowej Oceny Technicznej wymaga pisemnego uzgodnienia z Instytutem Techniki Budowlanej.



INSTYTUT TECHNIKI BUDOWLANEJ
ZAKŁAD CERTYFIKACJI
ul. FILTROWA 1, 00-611 WARSZAWA
tel.: (22) 57 35 157, (22) 57 93 195, fax: (22) 57 94 295
e-mail: certyfikacja@itb.pl, www.itb.pl

KRAJOWY CERTYFIKAT ZGODNOŚCI
ZAKŁADOWEJ KONTROLI PRODUKCJI
Nr 020-UWB-0802/Z

Zgodnie z rozporządzeniem Ministra Infrastruktury i Budownictwa z dnia 17 listopada 2016 r. w sprawie sposobu deklarowania właściwości użytkowych wyrobów budowlanych oraz sposobu znakowania ich znakiem budowlanym (Dz. U. poz. 1968), niniejszy certyfikat odnosi się do wyrobu budowlanego:

Zestaw wyrobów do mocowania modułów fotowoltaicznych i kolektorów słonecznych systemu Energy 5

opis techniczny wyrobu – zgodnie z pkt 1 ITB-KOT-2018/0109 wydanie 1
zamierzone zastosowanie – zgodnie z pkt 2 ITB-KOT-2018/0109 wydanie 1

objętego krajową oceną techniczną:

ITB-KOT-2018/0109 wydanie 1

wprowadzonego do obrotu pod nazwą lub znakiem firmowym producenta:

Energy 5 Sp. z o.o.
ul. Ziejkowa 5
09-500 Gostynin

i produkowanego w zakładzie produkcyjnym:

Energy 5 Sp. z o.o.
ul. Ziejkowa 5
09-500 Gostynin

Niniejszy certyfikat potwierdza, że wszystkie postanowienia, wynikające z krajowego systemu 2+, dotyczące oceny i weryfikacji stałości właściwości użytkowych, w odniesieniu do właściwości użytkowych wyrobu określonych w wyżej wymienionej krajowej ocenie technicznej, są stosowane oraz, że

zakładowa kontrola produkcji spełnia mające zastosowanie wymagania.

Certyfikat nr 020-UWB-0802/Z został wydany po raz pierwszy w dniu 09.02.2018 r. Niniejszy certyfikat pozostaje ważny do dnia 25.01.2023 r., pod warunkiem, że krajowa ocena techniczna, metody oceny i weryfikacji stałości właściwości użytkowych, sam wyrób budowlany i warunki jego wytwarzania nie ulegną istotnej zmianie, oraz że nie zostanie on zawieszony lub cofnięty przez akredytowaną jednostkę certyfikującą wyroby.

KIEROWNIK
Zakładu Certyfikacji
mgr inż. Katarzyna Hatowska

DYREKTOR
Instytutu Techniki Budowlanej
dr inż. Robert Geryło

Warszawa, 09.02.2018 r.

- The Energy5 systems were the first systems in Poland to receive the National Technical Assessment.

CERTYFIKAT
zgodności Zakładowej Kontroli Produkcji
2627-CPR-1090-1.84936367.TÜVRh.19.03
zgodnie z Rozporządzeniem (UE) Nr 305/2011 Parlamentu Europejskiego i Rady z dnia 9 marca 2011
(Rozporządzenie w sprawie wyrobów budowlanych - CPR)
Niniejszy certyfikat obowiązuje dla wyrobu budowlanego:

Wyrób budowlany	Elementy nośne oraz ich zestawy wykonane ze stali do klasy EXC2 według EN 1090-2:2018
Zastosowanie	dla konstrukcji nośnych we wszystkich typach budowli
Oznakowanie CE	ZA.3.2, ZA.3.4 według EN 1090-1:2009+A1:2011
Producent	**Energy5 Sp. z o.o.** ul. Ziejkowa 5; 09-500 Gostynin Polska
Zakład produkcyjny	ul. Ziejkowa 5; 09-500 Gostynin
Potwierdzenie	Niniejszy certyfikat potwierdza, że zastosowano wszystkie postanowienia dotyczące oceny i weryfikacji stałości procesów opisane w załączniku ZA normy zharmonizowanej EN 1090-1:2009+A1:2011 zgodnie z systemem 2+ oraz, że Zakładowa Kontrola Produkcji spełnia wszystkie wymagania określone w powyższej normie
Data pierwszego wydania	24.07.2018
Następna inspekcja w nadzorze	23.07.2021
Okres ważności	Niniejszy certyfikat zachowuje swoją ważność, do czasu aż nie zmienią się określone w normie zharmonizowanej metody badań i/lub wymagania zakładowej kontroli produkcji do oceny deklarowanych właściwości użytkowych oraz nie ulegną istotnej zmianie warunki produkcyjne w zakładzie.
Miejsce i data wystawienia	Zabrze, 24.07.2019

Lesznik Zadroga
Jednostka Notyfikowana

www.tuv.com

TÜVRheinland®
Precisely Right.

CERTYFIKAT
zgodności Zakładowej Kontroli Produkcji
2627-CPR-1090-1.84936367.TÜVRh.19.04
zgodnie z Rozporządzeniem (UE) Nr 305/2011 Parlamentu Europejskiego i Rady z dnia 9 marca 2011
(Rozporządzenie w sprawie wyrobów budowlanych - CPR)
Niniejszy certyfikat obowiązuje dla wyrobu budowlanego:

Wyrób budowlany	Elementy nośne oraz ich zestawy wykonane z aluminium do klasy EXC2 według EN 1090-3:2008
Zastosowanie	dla konstrukcji nośnych we wszystkich typach budowli
Oznakowanie CE	ZA.3.2, ZA.3.4 według EN 1090-1:2009+A1:2011
Producent	**Energy5 Sp. z o.o.** ul. Ziejkowa 5; 09-500 Gostynin Polska
Zakład produkcyjny	ul. Ziejkowa 5; 09-500 Gostynin
Potwierdzenie	Niniejszy certyfikat potwierdza, że zastosowano wszystkie postanowienia dotyczące oceny i weryfikacji stałości procesów opisane w załączniku ZA normy zharmonizowanej EN 1090-1:2009+A1:2011 zgodnie z systemem 2+ oraz, że Zakładowa Kontrola Produkcji spełnia wszystkie wymagania określone w powyższej normie
Data pierwszego wydania	24.07.2018
Następna inspekcja w nadzorze	23.07.2021
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Miejsce i data wystawienia	Zabrze, 24.07.2019

Lesznik Zadroga
Jednostka Notyfikowana

www.tuv.com

TÜVRheinland®
Precisely Right.

- The Energy5 systems hold certificates of conformity of the Plant Production Control according to EN 1090-1, EN 1090-2 for steel structures, and EN 1090-3 for aluminium structures.

CERTYFIKAT
nr: TM 01000400.001

Energy5

Właściciel licencji
ENERGY5 Sp. z o.o.
ul. Ziejkowa 5
09-500 Gostynin, PL

Miejsce produkcji
ENERGY5 Sp. z o.o.
ul. Ziejkowa 5
09-500 Gostynin, PL

Numer projektu
26100426

Nasze oznaczenie
SDI84937286

Termin ważności
od 27.11.2018 do 26.11.2023

Podstawa badań
PN-EN 755-9:2010 PN-EN 10162:2005 PN-EN ISO 1461:2011 PN-EN ISO 7438:2006
PN-EN 10346:2011 p.7.4.2 i 7.5.2 PN-EN ISO 2808:2008 (metoda 7C)
ETAG 034 cz. 2 Metoda własna ITB – masa zestawu, odporność na obciążenie równomiernie rozłożone (śniegiem, parcie i ssanie wiatru)

TÜV Rheinland Polska Sp. z o.o. oświadcza, że niżej opisany wyrób jest zgodny z wymaganiami przywołanych dokumentów odniesienia:

Konstrukcje montażowe PV – Energy5

- System do montażu instalacji fotowoltaicznych na dachach płaskich.
- System do montażu instalacji fotowoltaicznych na dachach skośnych.
- System do montażu instalacji fotowoltaicznych wolnostojących naziemnych.
- Instalacje wiat parkingowych

TÜV Rheinland Polska Sp. z o.o.
ul. Komitetu Obrony Robotników 56,
02-146 Warszawa, Polska
Tel.: (+48/22) 846 79 99
Tel.: (+48/22) 888 37 42
e-mail: post@pl.tuv.com

Jednostka Certyfikująca
Tomasz Orłoszowski

Warszawa, 27.11.2018

TÜVRheinland®
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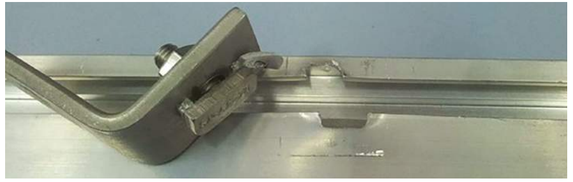
- A certificate authorising the use of Energy5 products behind our easter border.

WWW.ENERGY5.PL

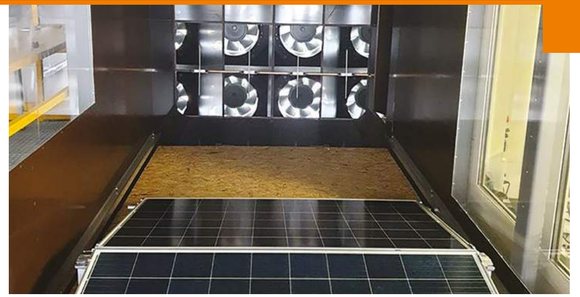
Loading tests of PV panels with their supporting structure

The technical parameters of our structures are confirmed by the TYPE tests conducted at the Building Research Institute, concerning:

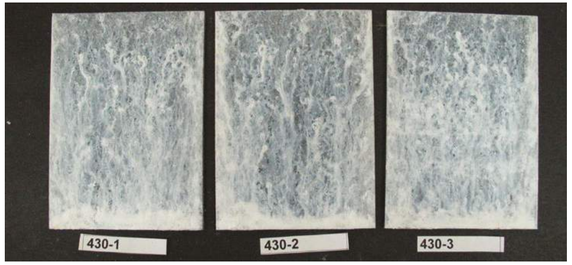
- Product classification in terms of their shape and dimensions, for conformance with PN-EN 755-9:2010.
- Classification of aluminium profiles according to their durability, in accordance with PN-EN 1999-1-1:2011 (in this respect they are included in class B - without protective coating, and this means that they can be used in environments of a corrosion class C1, C2 and C3 in accordance with PN-EN ISO 12944-2:2001).
- Connections strength.
- PV panels loading, including their supporting structure.
- System strength on a flat roof in a wind tunnel.
- System susceptibility to corrosion in salt and sulphur chambers.
- Strength of glued Aero S and Aero EW systems for covering with a membrane.



Connections strength tests



Strength tests for flat roof systems in a wind tunnel



Corrosion tests of the systems in salt and sulphur chambers

Comparative tests of energy yield for the tracker vs. fixed structures

Fire resistance tests of the BIPV façade system

Freestanding SYSTEMS

What the freestanding systems are?

The freestanding systems are overground structures, enabling installation of over a dozen PV modules in household installations, up to hundreds of thousands modules at huge photovoltaic power plants, generating impressive amounts of energy.

Individual approach

The systems proposed by us are selected individually, taking into account the **shape of a terrain, geotechnical conditions, and wind and snow zones in a specific location.** We manufacture structures for modules with an aluminium frame, as well as for glass-glass or bifacial modules. We provide a support of well-qualified specialists from a design to a final installation.

25

a guarantee for the systems **for up to 25 years**

different table inclines

vertical or horizontal layout of the modules

structures adopted to **glass-glass and bifacial modules**

Extensive range

We offer pile driving services, including **pull out tests for structural piles,** required for a correct installation of the structure.

Safety guarantee

We make all efforts possible to ensure that systems designed by us not only **reduce monthly electricity bills, but are also safe**. We perform tests of all connecting elements in the system, guaranteeing **the long-term reliability** and **smooth operation.**

Resistance to corrosion

To ensure correct protection against corrosion, the overground Energy5 systems are made of black steel, S320, coated with the metallic coat Magnelis®. The coating is characterised by its significantly **higher resistance to corrosion,** when compared to galvanised products. This innovative coating guarantees a long-term protection against corrosion in aggressive environmental conditions, up to the corrosion class C5, and this translates into the increased life of the photovoltaic systems.

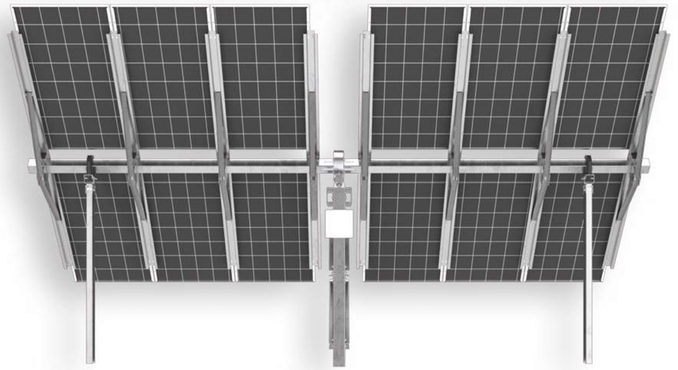
Mg3% Al3,5%

EUIPO
URZĄD UNII EUROPEJSKIEJ DS. WŁASNOŚCI INTELEKTUALNEJ

PHOTOVOLTAIC TRACKER
NEW

DRIVEN IN - WITH ONE SUPPORT

- A photovoltaic tracker is a system following the sun that eliminates shading of modules on their bottom side and is dedicated to large area farms.
- A single-axle system enables **the system movement along the east-west axis**, so photovoltaic panels are set perpendicularly to the sun rays direction.
- The main advantage of this system is the increased efficiency of obtaining solar energy, as **yields are higher by ca. 30% on average**, versus fixed freestanding structures.
- **The system is equipped with a central unit, controlling the tracker function, and a weather station**, measuring the wind strength and direction, and a degree of cloudiness. When critical values are exceeded, the system forces automatic setting of panels in a preferred safe position or, when the sky is overcast, it sets modules in the position that is most optimal for energy yields.



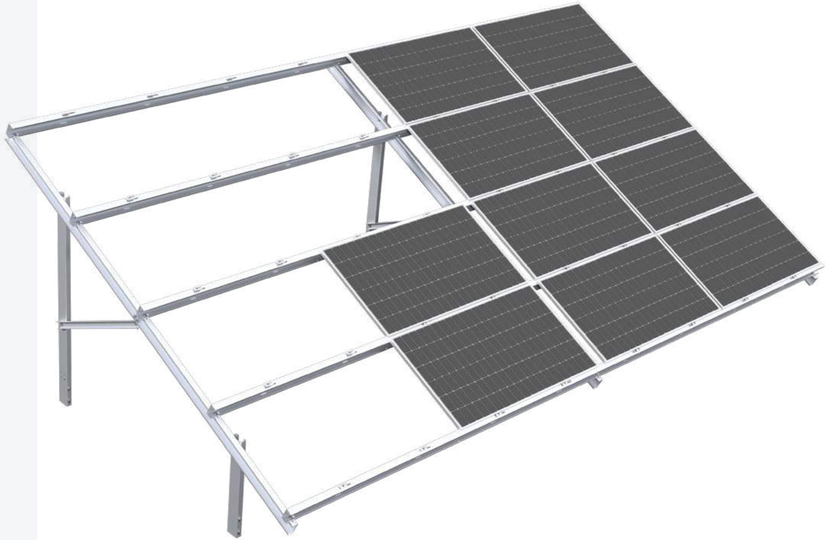
TECHNICAL SPECIFICATION	
Material	black steel S320-S450 with the Magnelis® coating or galvanised steel
Layout	vertical
Scope of works (swing angle)	+/- 60°
Fixing method	driven in
Guarantee	up to 25 years guarantee for perforation
Adapted to bifacial modules	yes
System components/functions	• sun tracking algorithm • backtracking • weather station • station monitoring cloudiness • maintenance mode • sensors monitoring snow removal • control cabinet: a server and an operator panel • emergency power system • application monitoring 24/7

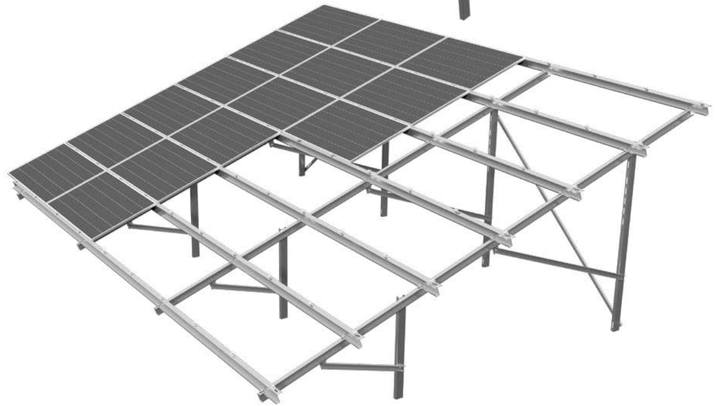
- **A local control room is equipped with an operator panel**, so the entire farm can be controlled from one location, e.g., during maintenance works, increasing the safety of operation. A controller analyses parameters of individual trackers on a regular basis, and informs about any errors. With this system, the farm ground coverage ratio (GCR) can be increased, and modules can be installed even in difficult terrain. The system is connected to an internal security network, so **the farm can be monitored 24 / 7 / 365.**
- The Energy5 photovoltaic tracker **is also equipped with precipitation sensors** that can be used to measure the thickness of the snow layer. When heavy snowfall is detected, trackers go into **the automatic snow removal mode** - rotating the structures alternately.

TABLES DRIVEN IN OR FIXED MECHANICALLY

BIFACIAL - WITH TWO SUPPORTS

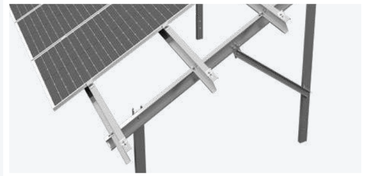
- **The bifacial system** is characterised by a reduced shadowing of modules by structural elements. The structure profiles are spaced in such way that they enable a maximum exposure of the bottom side of the bifacial modules to reflected and scattered light.



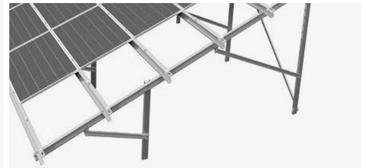


DRIVEN IN - WITH TWO SUPPORTS

- Vertical arrangement of two modules.



- Horizontal arrangement of six modules.

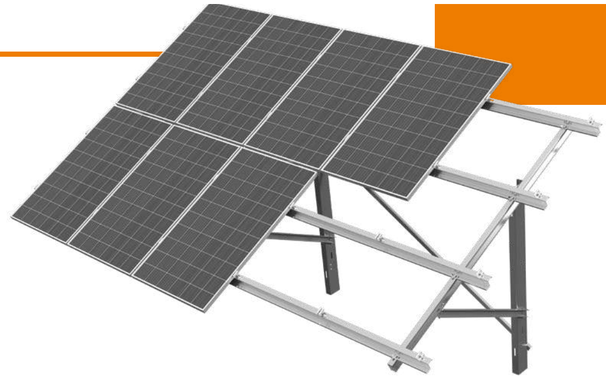


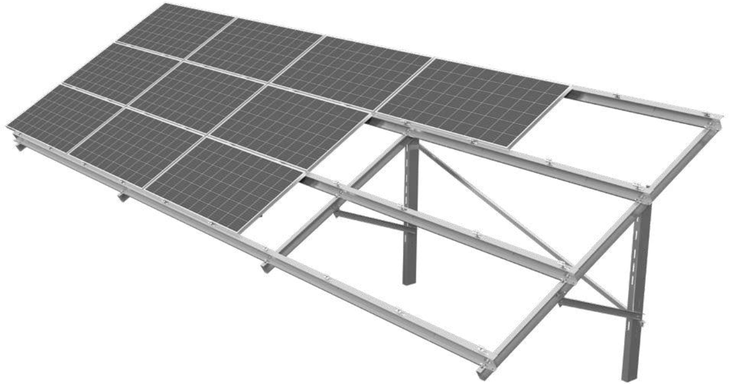
Freestanding SYSTEMS

DRIVEN IN – WITH TWO SUPPORTS

- Horizontal arrangement of four modules.

Freestanding SYSTEMS





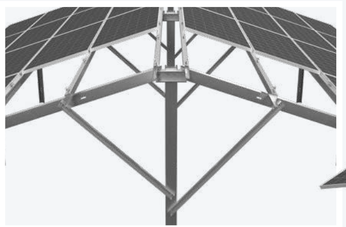
DRIVEN IN - WITH ONE SUPPORT

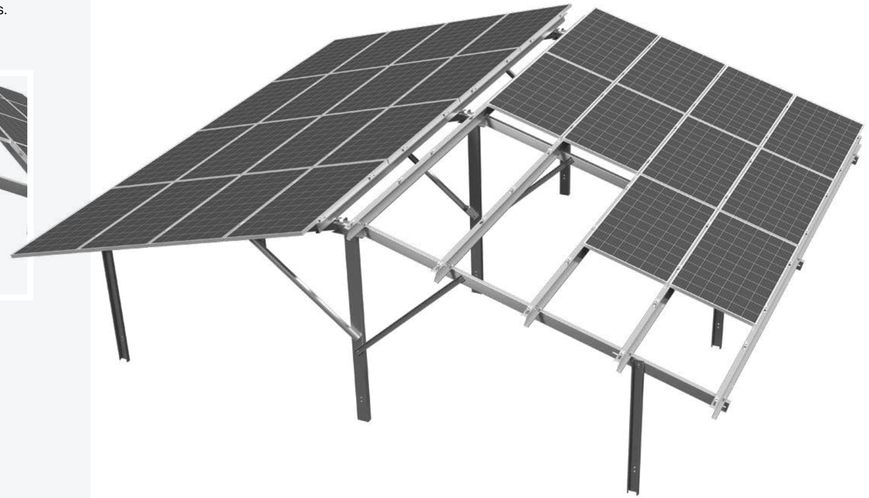
- Vertical arrangement of two modules.

- Horizontal arrangement of three modules.

DRIVEN IN - WITH THREE SUPPORTS EAST / WEST

- Horizontal arrangement of four modules.





MECHANICALLY FIXED - WITH TWO SUPPORTS

- Horizontal arrangement of four modules.
- Option for a different configuration of the modules.

Roof
SYSTEMS

Safety
Regular
Production
Surveillance
TÜVRheinland
CERTIFIED
www.tuv.com
ID 0000065055

FOR FLAT ROOF

FOR PITCHED ROOF

What are the roof systems?

Roof systems are solutions in which a **roof is used as a surface for fixing of photovoltaic modules**. The installation method is selected according to the **roof structure** and **decking.**

When selecting the roof fixing system, the following aspects are particularly important:

- roof load bearing capacity, i.e., its acceptable load,
- roof tightness, being a precondition for the use of an invasive system.

Extensive range

The systems offered for flat roofs (the incline of up to 5°) include Ekierki Eco, with a ballast or fixed mechanically, as well as ballast aerodynamic systems Aero S and Aero EW.

We also offer systems for pitched roofs (the incline exceeding 5°), selected individually for each type of roof decking. With a small number of elements, the roof systems are quick and easy to assembly.

Resistance to corrosion

Roof structures are made of **high quality aluminium profiles**, with all connecting elements manufactured of **stainless steel**. This type of connection is the best solution for structures exposed to adverse weather conditions, ensuring an **excellent resistance to corrosion**.

10

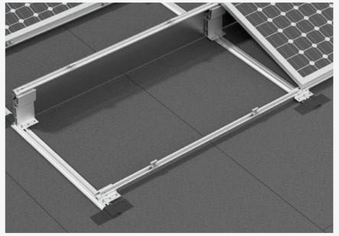
a 10-year guarantee for the systems

vertical or horizontal layout of the modules

structures adopted to **glass-glass modules**

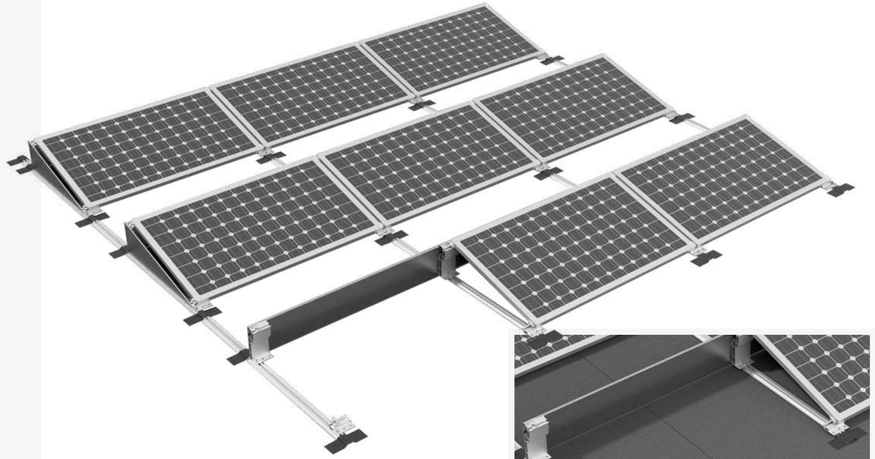
AERO S - GLUED* SOUTH

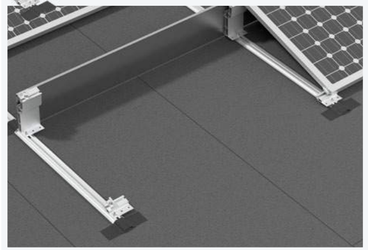
The Aero S system glued to membrane/ tar paper is based on glueing of fixing components from the same material as the roof decking. This way, a stable structure can be formed without unnecessary loading of the roof. The installation does not interfere with the roof decking.

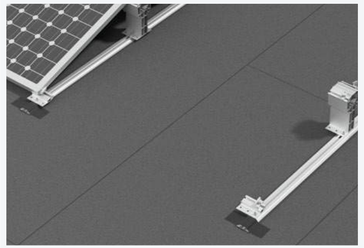


INSTALLATION ALONG A LONG SIDE

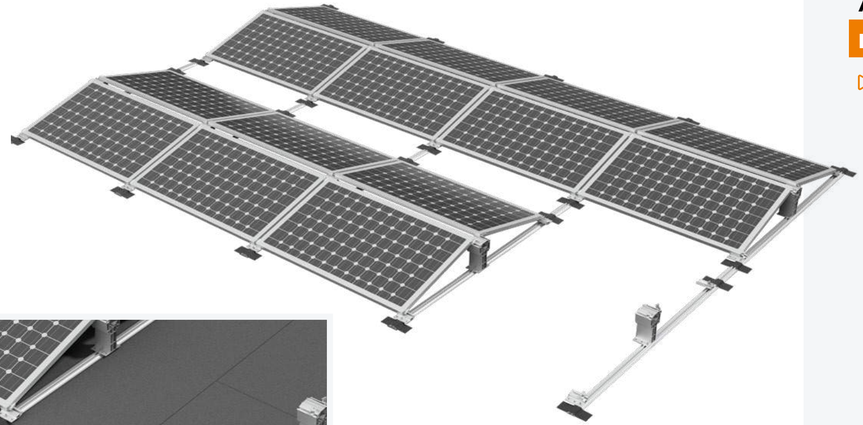
* Horizontal installation of large modules on their short side is only possible when a manufacturer of the modules allows it.







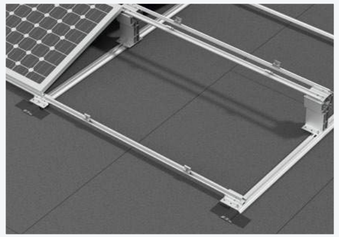
INSTALLATION ALONG A SHORT SIDE **INSTALLATION ALONG A SHORT SIDE**



AERO EW - GLUED*

EAST / WEST

The Aero EW system glued to membrane/ tar paper is based on glueing of fixing components from the same material as the roof decking. This way, a stable structure can be formed without unnecessary loading of the roof. The installation does not interfere with the roof decking.

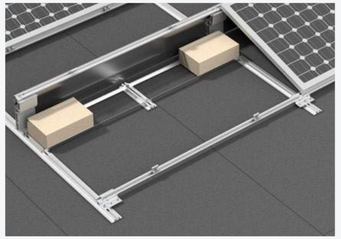


INSTALLATION ALONG A LONG SIDE

* Horizontal installation of large modules on their short side is only possible when a manufacturer of the modules allows it.

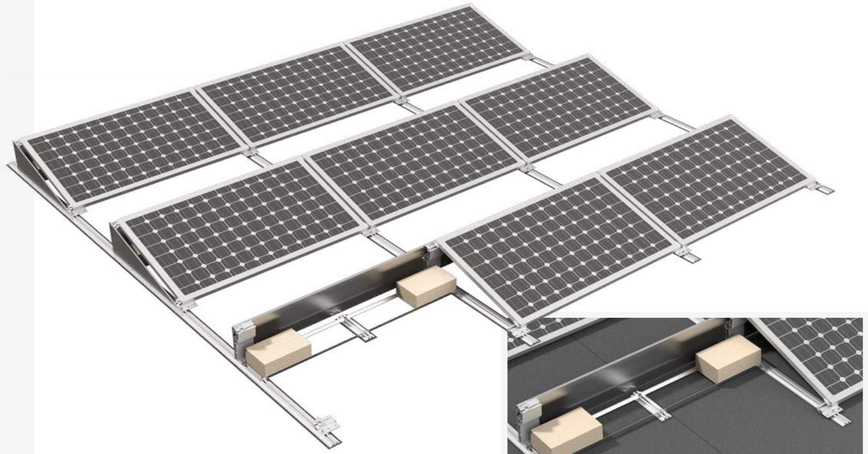
AERO S* SOUTH

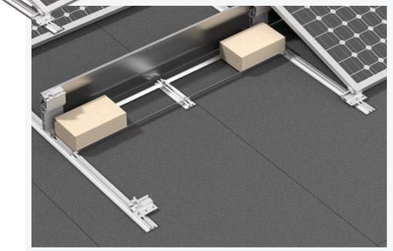
- An advantage of the Aero S is a permanent connection of rows and the use of side and rear covers, which minimise the wind influence on the structure, help to reduce the amount of required ballast, and in consequence, decrease the roof load. The installation does not interfere with the roof decking.
- The tests performed in a wind tunnel confirm that the ballast can be **reduced or even completely removed**.

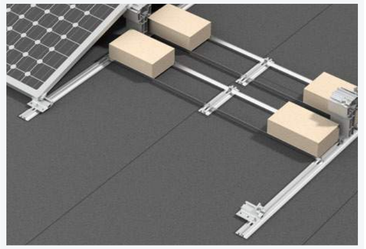


INSTALLATION ALONG A LONG SIDE

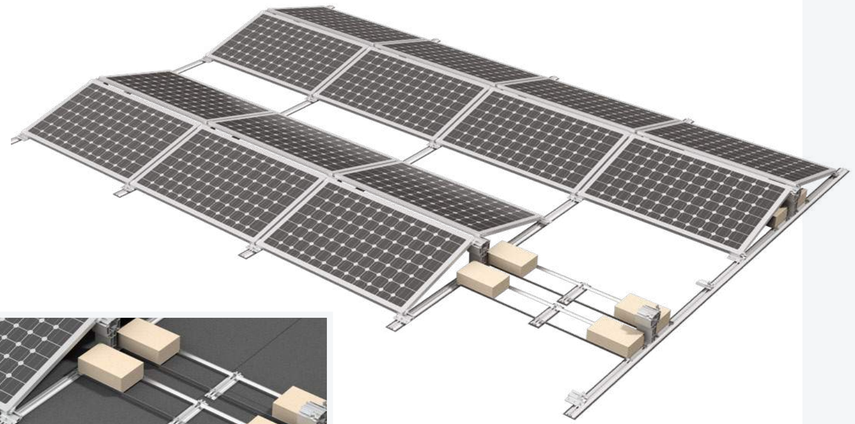
* Horizontal installation of large modules on their short side is only possible when a manufacturer of the modules allows it.



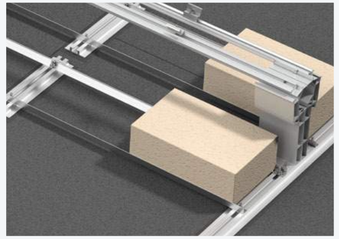


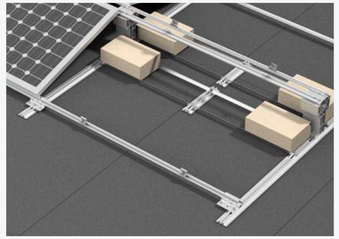


INSTALLATION ALONG A SHORT SIDE **INSTALLATION ALONG A SHORT SIDE**



AERO EW* EAST / WEST





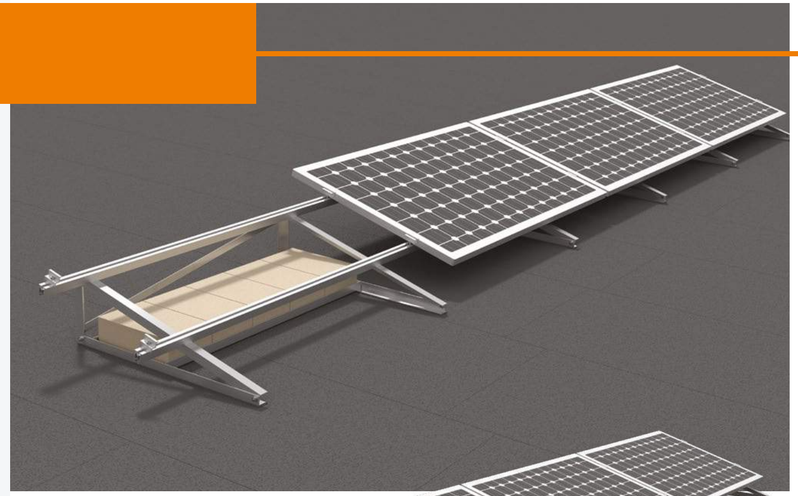
INSTALLATION ALONG A LONG SIDE

* Horizontal installation of large modules on their short side is only possible when a manufacturer of the modules allows it.

Systems
FOR FLAT ROOFS

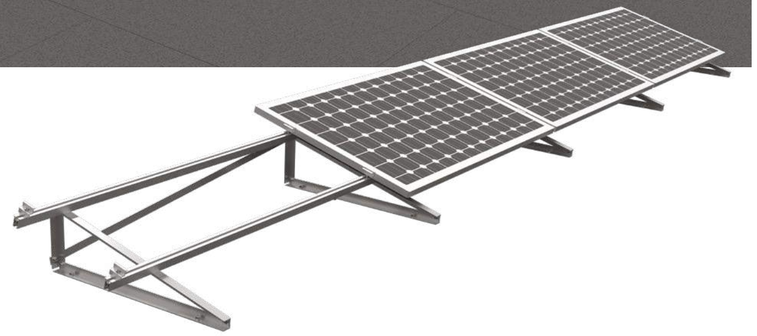
EKIERKA ECO WITH THE BALLAST*

- An advantage of the Ekierka Eco solution is a possibility to install modules horizontally, and to set the structure at different inclines. The installation does not interfere with the roof decking.



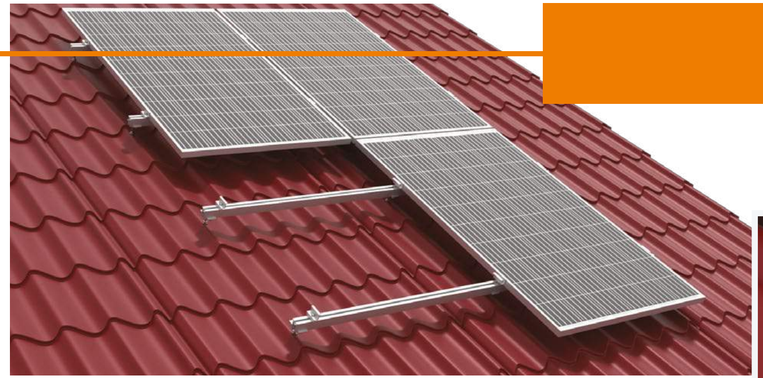
EKIERKA ECO - MECHANICAL INSTALLATION*

- An option of vertical or horizontal installation.

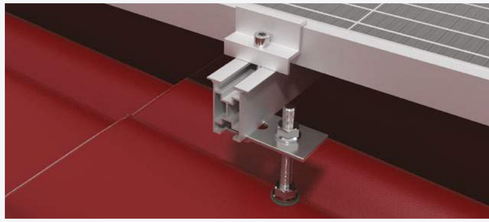


* Horizontal installation of large modules on their short side is only possible when a manufacturer of the modules allows it.

Systems
FOR PITCHED ROOF



COVERED WITH METAL ROOFING TILES



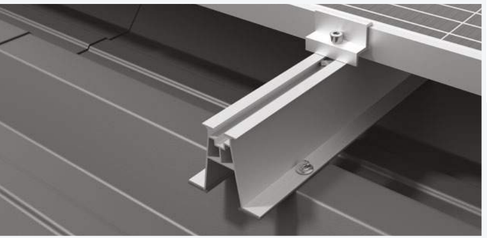
COVERED WITH METAL ROOFING - CROSS SYSTEM

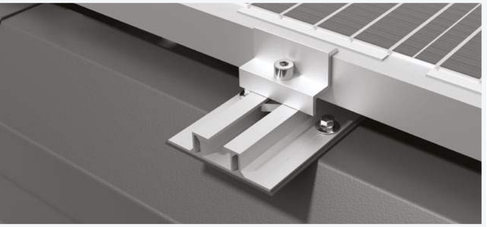
- Horizontal, cross installation with double threaded bolts.

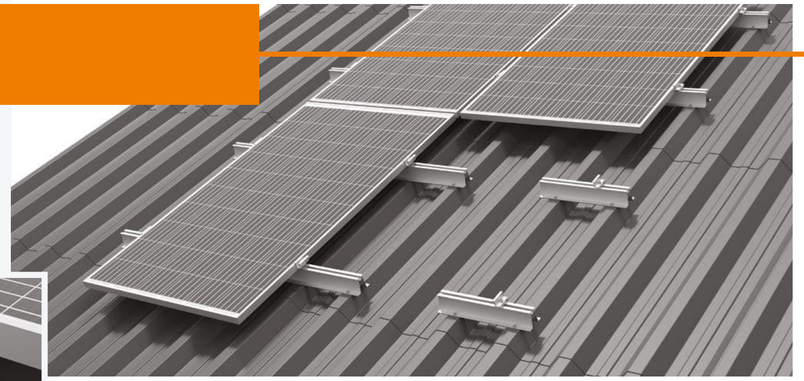
Systems
FOR PITCHED ROOF

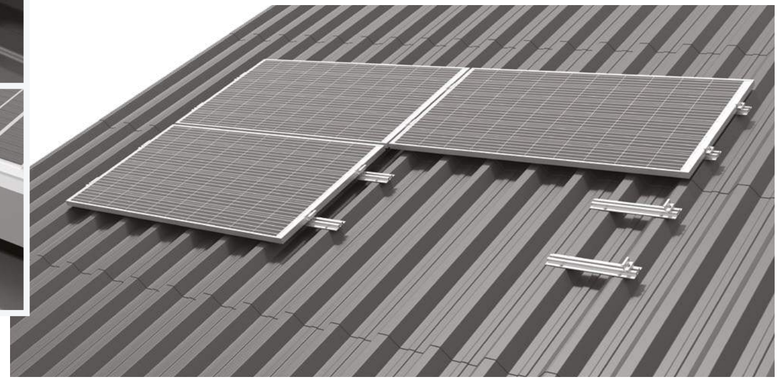
COVERED WITH TRAPEZOID METAL SHEETS

▷ Installation with a trapezoid bridge.





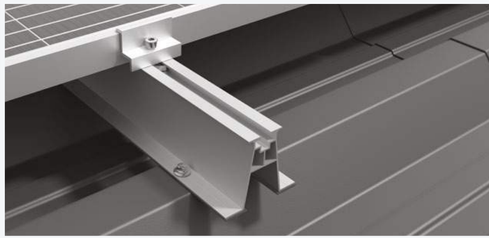


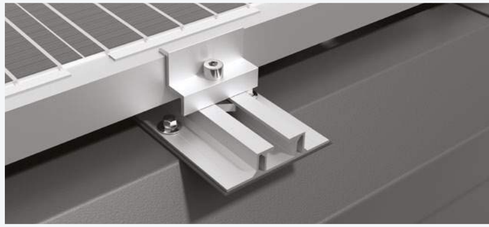


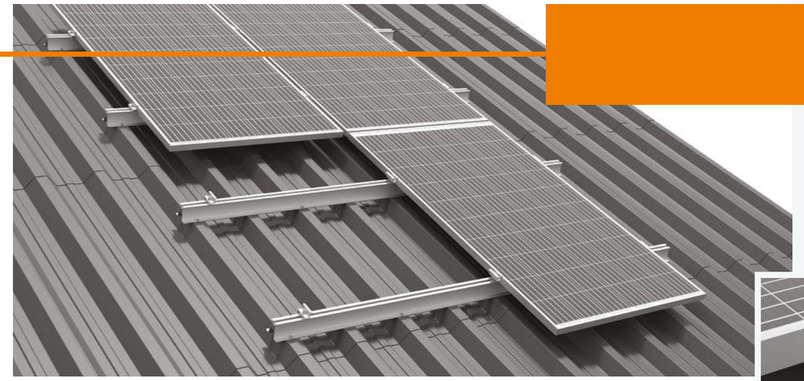
Systems
FOR PITCHED ROOF

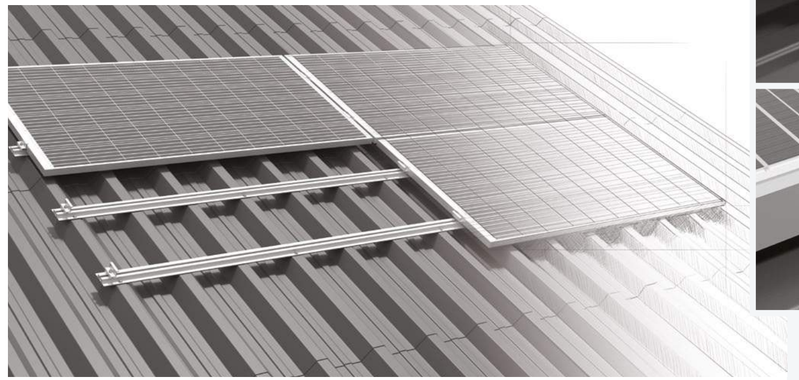
COVERED WITH TRAPEZOID METAL SHEETS

▷ Installation with a long trapezoid rail.





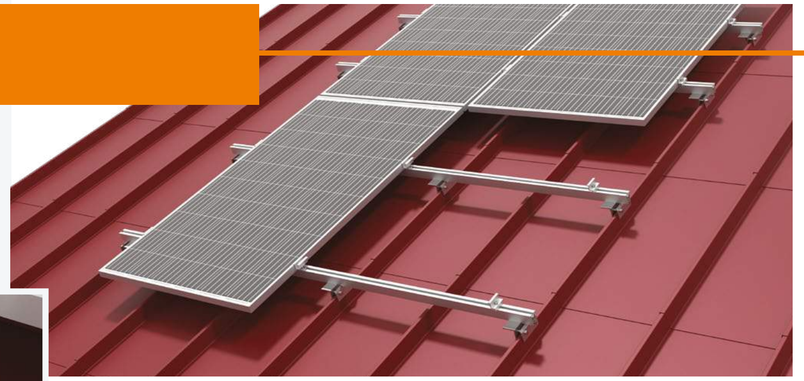


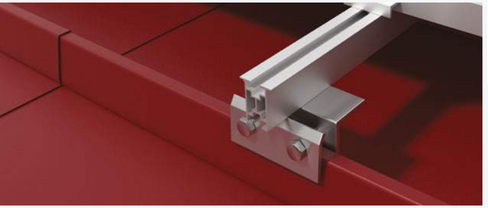


Systems
FOR PITCHED ROOF

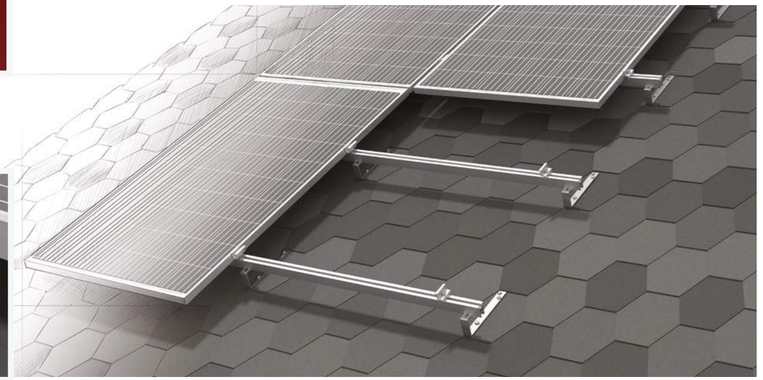
COVERED WITH SHEET METAL JOINED WITH A SEAM

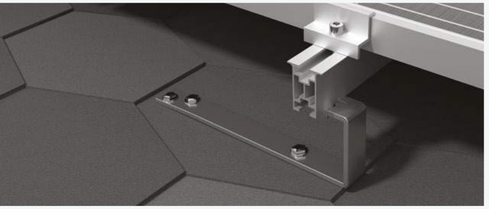
- The installation does not interfere with the roof decking.





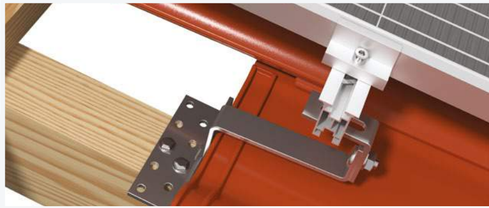
COVERED WITH ROOF SHINGLE / SLATE TILES

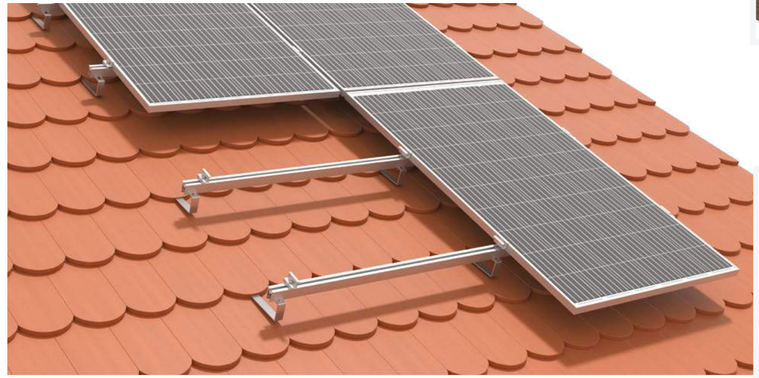




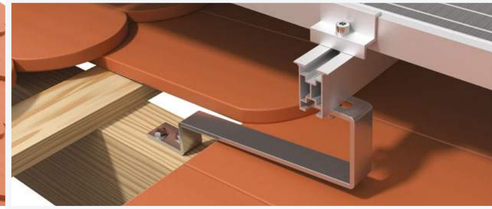
Systems
FOR PITCHED ROOF

COVERED WITH CERAMIC TILES





COVERED WITH FLAT TILES



Systems for a roof
COVERED WITH SANDWICH PANELS

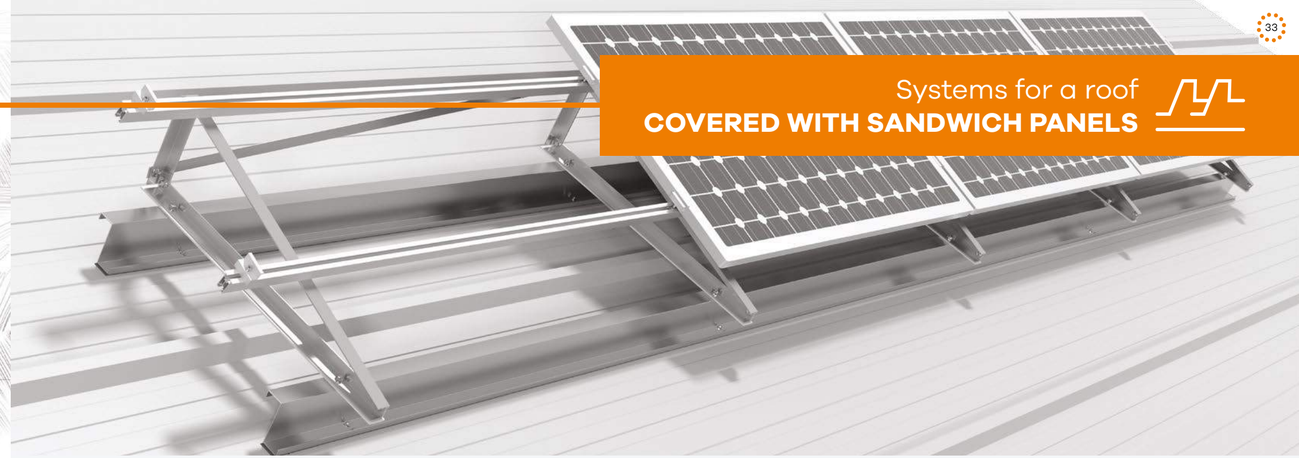
Customised design

Systems for a roof covered with sandwich panels are fixed to the roof substructure, for example, using roofing screws. The steel profiles fixed to purlins are used - this solution prevents transfer of the load onto the sandwich panel and its permanent damage. Each design is analysed individually, so you can be sure that together we will find the best solution.

a 10-year guarantee for the systems

vertical or horizontal layout of the modules

structures adopted to **glass-glass modules**

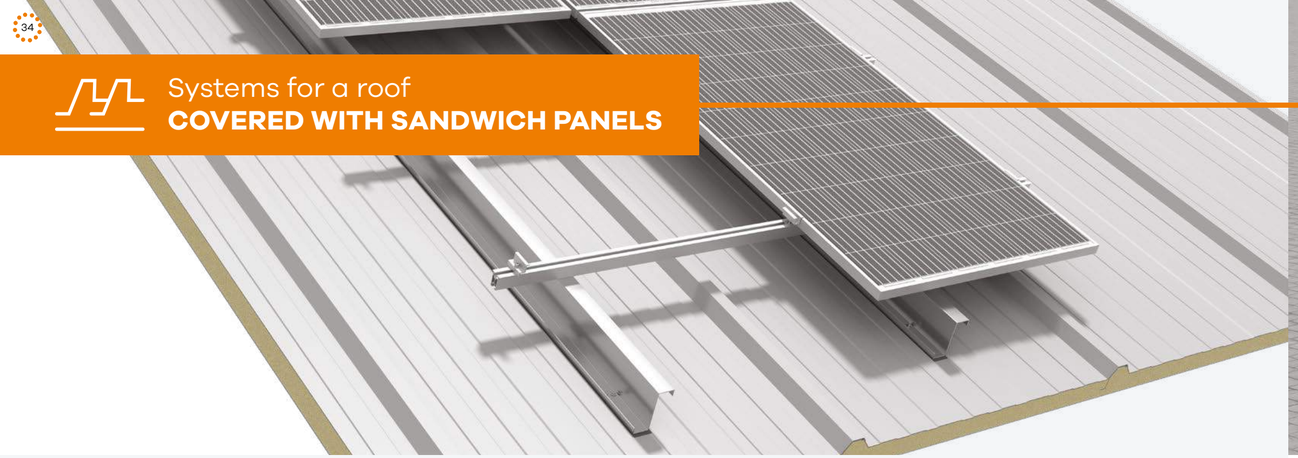


Systems for a roof
COVERED WITH SANDWICH PANELS

EKIERKA ECO - FLAT ROOF SYSTEM SOUTH

TECHNICAL SPECIFICATION	
System material	Aluminium and Magnelis® steel sheet
Roof type	Flat/sandwich panel
Module orientation	Horizontal
Fixing system	Triangles 25°
Roof surface area for 1 kW	6.8 m² (for the 1650x992 module)
Roof load (a module of 20 kg 250 W was assumed)	135.2 kg/1 kW 19.9 kg/m²

Note: The calculations did not take into account the snow load and wind pressure/suction

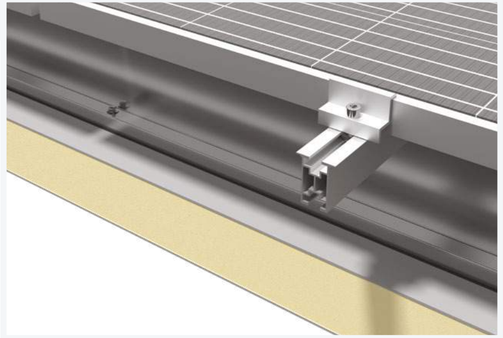


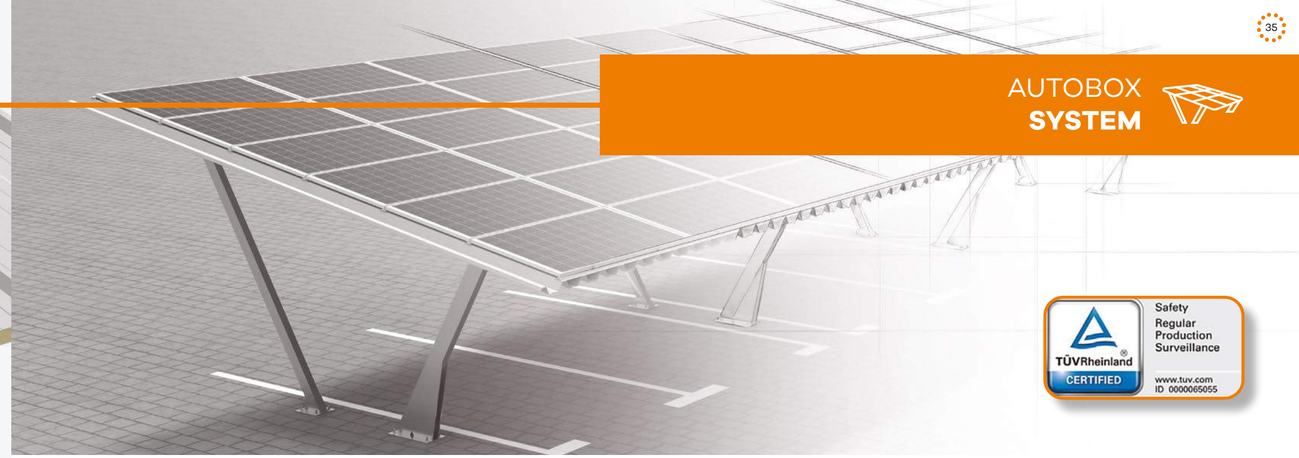
Systems for a roof
COVERED WITH SANDWICH PANELS

PITCHED ROOF SYSTEM

TECHNICAL SPECIFICATION	
System material	Aluminium and Magnelis® steel sheet
Roof type	Pitched/sandwich panel
Module orientation	Vertical
Fixing system	Along the longer side, cross installation
Roof surface area for 1 kW	6.65 m^2 (for the 1650x992 module)
Roof load (a module of 20 kg 250 W was assumed)	103.7 kg/1 kW 15.6 kg/m^2

Note: The calculations did not take into account the snow load and wind pressure/suction





AUTOBOX
SYSTEM

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What the AUTOBOX systems are?

The AUTOBOX systems are ground structures intended to be used at parking spaces. This solution combines a functionality of a shed with a photovoltaic system which can be adapted to be used as a charging station for electric cars powered by energy obtained from a photovoltaic system.

Properties and structures

AUTOBOX systems are available as a **single** (two parking spaces) or a **multi-segmented** option, with a roof incline up to 10°. The load bearing structure, supported at two points, can be covered with trapezoidal sheet metal or be formed solely of purlins of cold-bended profiles. The shed structure is made of **hot-dip galvanised steel**, and the components of the support structure, to which modules and connectors are fixed, are **aluminium**.

10

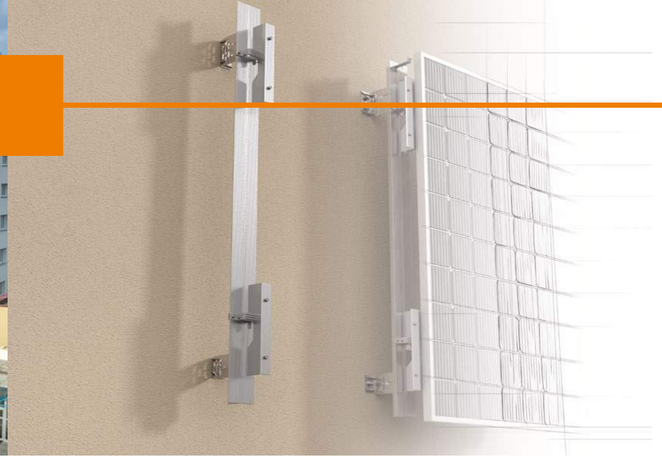
a 10-year guarantee
for the systems

a structure can be covered with
trapezoidal sheet metal

vertical or horizontal layout
of the modules

a single- or a multi-segmented
shed

Façade SYSTEMS



What the BIPV façade systems are?

The Building Integrated Photovoltaics (BIPV) façade systems are an ideal solutions when there is no space for a ground system, and the roof structure makes installation of PV modules difficult or impossible.

Modern technology

There is a gap (20 mm) between the insulating material and the external cladding (made of modules), ensuring **air circulation**, and this **improves thermal insulation** of a building, and allows to **remove moisture**.

Effectiveness and aesthetics

The systems designed for fixing to a façade are not only **exceptionally effective**, but also **aesthetic - they emphasise the modern character of the building**. The façade systems can be used in office, hospital or educational buildings.

a 10-year guarantee
for the systems

improved air circulation

any layout of the modules

structures adopted to **glass-glass modules**

Customised SYSTEMS

Customised systems

We manufacture many non-standard systems, not available anywhere else in the market. We develop each system individually, with a support of well-qualified engineers, so each design is optimised in terms of a layout of modules.

Completed
FREESTANDING PROJECTS

Completed
FREESTANDING PROJECTS

Completed
ROOF PROJECTS

Completed
ROOF PROJECTS

Completed
AUTOBOX AND FAÇADES PROJECTS

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