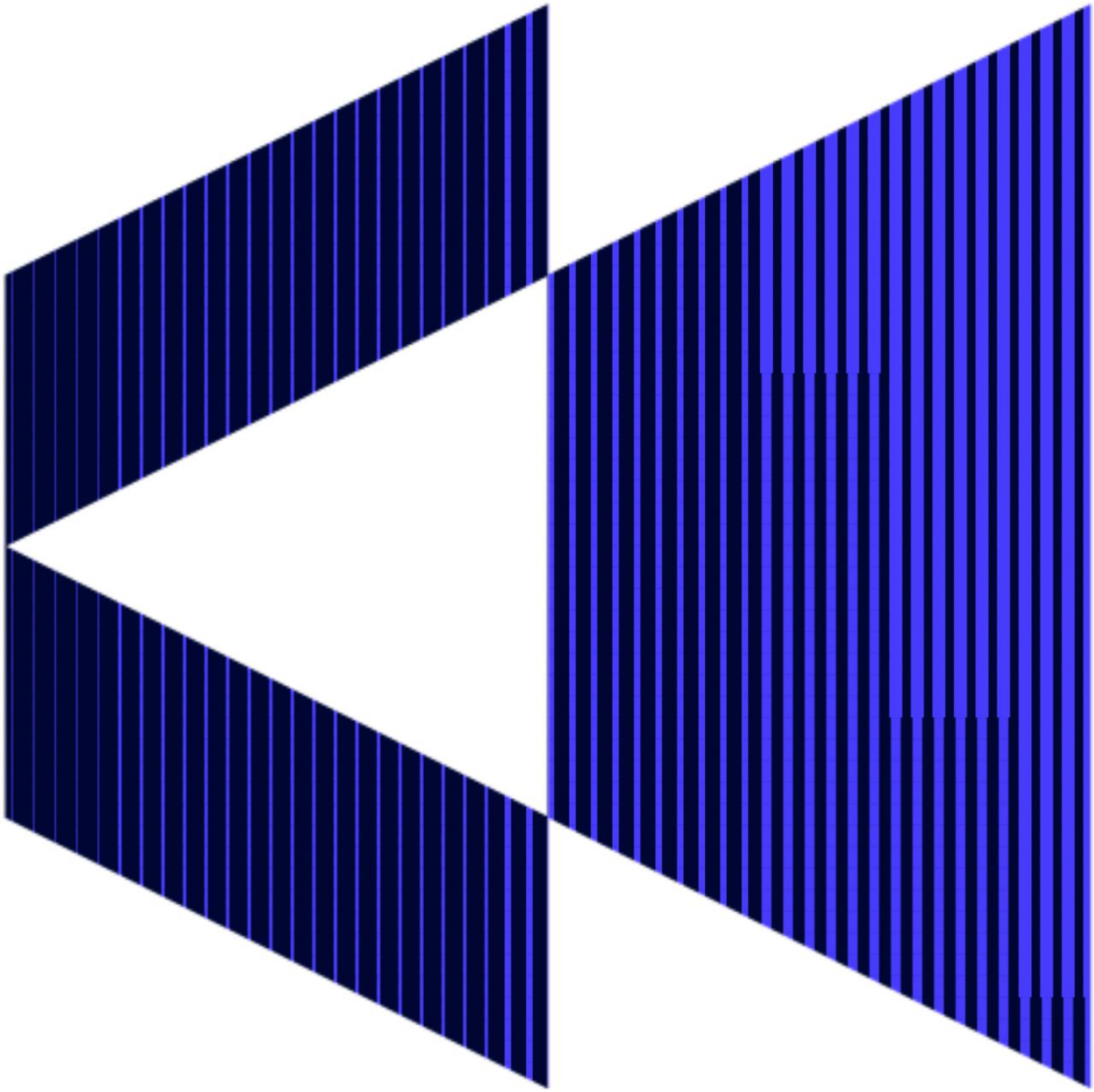
Augenium



AURE x Helios

Roof Solar Panels Installation Manual

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Modules Covered in this Manual

This document applies to the modules listed below:

`AURE-RF-144-xxxN (xxx=590-600 in steps of 5)`

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1 About Augenium

Augenium Limited is an Australian public company based in West Perth, Western Australia, Augenium is a global leader in development of building-integrated photovoltaic (BIPV) solutions. Its technology transforms conventional building elements such as façades, windows and roofs into energy-generating components that support low-carbon and net-zero building designs.

Augenium develops a family of solar façade and glazing products, including Solar Vision Glass, spandrel panels, cladding, balustrades, skylights, and greenhouse glazing, as well as metal-backed rooftop systems for carparks and building roofs. These solutions are designed to integrate with standard framing systems while maintaining architectural aesthetics and daylight performance. By bridging the gap between the construction and renewable energy industries, Augenium provides architects and developers with a tangible pathway to Net Zero.

2 Introduction to the Product

2.1 Product Description - AURE x Helios Roof Panels

The AURE x Helios Panel is a building-integrated photovoltaic (BIPV) system that generates electricity when installed over a conventional metal roof. It combines a tempered-glass PV laminate with a profiled metal or lightweight backing plate, forming a weatherproof roofing element fixed directly to the supporting roof sheeting. The system creates a continuous PV roof surface with concealed fasteners and integrated waterproofing.

When installed over compatible metal roof decks, the PV panels could sit above the existing roof and primary weatherproof layer (if required) and form a ventilated cavity. This air gap assists with heat dissipation from the PV modules and can contribute to improved thermal performance of the roof system compared with conventional overlay PV installations.

2.2 Intended Use

The AURE x Helios Panel system is intended for use as:

- A building-integrated photovoltaic generator on pitched metal roofs; and
- A functional roof cladding element forming part of the overall roofing system.

Typical applications include industrial, commercial, and institutional buildings, carparks, and ancillary structures where the PV panels are installed as part of new roofing works or as an overlay on existing compatible metal roofs.

The system is designed to operate at low DC voltage and be compatible with most inverters/optimisers and microinverters, and to meet relevant TÜV / UL790 / building-material fire classification requirements when installed in accordance with this manual and the referenced design atlas.

2.3 Product Variants

The AURE x Helios Roof Panels are available in two main variants:

2.3.1 Steel-Backed System –Trafficable

- PV laminate bonded to an aluminium-zinc coated steel backing plate and fixed to the profiled metal roof using concealed fasteners and structural adhesive, with overlapping joints and perimeter sealing.
- Tested to achieve Class A fire performance under IEC 61730 and UL790 test regimes when used as part of the complete BRPV roof build-up.
- Tested to achieve A2-s1,d0 limited combustibility rating in accordance with GB 8624.
- Designed to be trafficable for occasional maintenance access when the roof build-up, fasteners and supporting structure are designed and installed in accordance with this

manual and the project-specific structural design. Walking load capacities are strictly based on instructions in this manual.

2.3.2 Aluminium-Backed Lightweight System –Non-Trafficable

- PV laminate bonded to a lightweight aluminium alloy back sheet, providing a significantly lower mass per square metre than the steel-backed system.
- Certified with a Class C fire rating under IEC 61730 and UL 790 and intended for applications where reduced dead load is critical and routine foot traffic on the PV surface is not required.
- This variant is non-trafficable: access over the roof must be provided via designated walkways, maintenance platforms or adjacent non-PV roof areas as defined in the project design and site-specific safe-work procedures.

2.4 Compatible Roof Types

The AURE x Helios Roof Panels are designed for use on profiled metal roofs that match the BRPV design atlas details, including:

- Trapezoidal profiled metal roof sheeting
- Angle-seam / ribbed profiles (e.g. “angle-chase” types)
- Standing-seam metal roofs

Each roof type has specific fixings, sealant locations and waterproofing details, as shown in the referenced Helios installation drawings. Only the roof profiles and build-ups validated in those documents may be used, unless a project-specific engineering assessment is completed and approved by Augenium.

3 About the Manual

3.1 Purpose and Scope of This Manual

The purpose of this manual is to provide installers, designers and commissioning personnel with the information required to safely, correctly and consistently install AURE x Helios Roof Panels in accordance with:

- The product's mechanical and electrical design,
- Relevant TÜV and Australian standards, and
- Augenium's warranty and performance requirements.

This manual:

- Describes the product and its intended use,
- Sets out mandatory safety precautions and site requirements,
- Defines installation procedures for both the steel (Class A fire rated, trafficable) and aluminium (Class C fire rated, non-trafficable) systems,
- Provides guidance on maintenance.
- Identifies the key reference drawings and documents that must be used together with these instructions.

It is not a design handbook or a substitute for professional engineering or electrical design. The structural design of the roof, electrical system design and compliance with all applicable regulations remain the responsibility of the project designer, principal contractor and licensed electrician.

3.2 Who Should Use This Manual

This document is intended for use by:

- Roofing contractors and installers responsible for installing AURE x Helios Roof Panels and associated roof flashings and fixings.
- Licensed electricians responsible for DC cabling, earthing, protection devices and connection of the PV system to inverters and switchboards.
- Designers and engineers (architects, structural and electrical engineers) who need to understand the product limitations, fixing requirements and interface details with the building structure.
- Supervisors, site managers and commissioning personnel overseeing installation quality, safety and final testing.

It assumes the reader has appropriate trade qualifications, experience with metal roofing and/or PV systems, and is familiar with the relevant Australian standards and local regulatory requirements.

3.3 Definition and Abbreviations

3.3.1 Building-Integrated Photovoltaics (BIPV)

Installing photovoltaic systems on buildings and, through dedicated design, achieving good integration between the PV system and the building, where the PV components also perform building functions.

3.3.2 Building-Related Photovoltaics (BRPV)

Combining photovoltaic power generation with building materials to form inseparable building materials or structural components, providing enhanced functions such as waterproofing, fire resistance, and walkability.

3.3.3 Photovoltaic Cell

A device that directly converts solar radiation energy into electrical energy, also known as a solar cell.

3.3.4 Photovoltaic Module

The smallest indivisible photovoltaic cell assembly that has encapsulation and internal electrical connections, capable of independently providing DC output and having a load-bearing capacity.

3.3.5 Photovoltaic Array

A DC power generation unit formed by assembling multiple PV modules together mechanically and electrically in a certain arrangement and fixing them with supporting structures; also called a PV string.

3.3.6 Grid-Connected Photovoltaic System

A photovoltaic system connected to the public power grid.

3.3.7 Off-Grid Photovoltaic System

A photovoltaic system not connected to the public grid; also called a standalone PV system.

3.3.8 Islanding Effect

When the grid loses voltage, a grid-connected PV system continues supplying power to a portion of the grid circuit.

3.3.9 Peak Sun Hours

The period during which the accumulated solar irradiance over a certain time is equivalent to solar radiation at 1000 W/m^2.

3.3.10 Installed Capacity

The sum of the rated power of all PV modules installed in a photovoltaic power generation system. Unit: watt-peak (Wp).

3.3.11 Watt-Peak (Wp)

The unit of maximum output power of a PV module or array under standard test conditions.

3.3.12 Photovoltaic Cable

A cable used on the DC side of photovoltaic systems, featuring UV resistance, ozone resistance, acid and alkali resistance, and high/low temperature resistance; commonly referred to as “PV cable”.

3.3.13 Solar Photovoltaic System

A power generation system that uses photovoltaic cells to directly convert solar radiation energy into electrical energy; abbreviated as PV system.

3.3.14 AURE x Helios Roof Panels

Augenium roof products that integrate PV generation into existing or new roof, so that the panels act both as a weatherproof roof element and as a photovoltaic generator.

3.3.15 Trafficable System

A roof system designed to safely support controlled foot traffic for inspection and maintenance, within the limits stated in the design.

3.3.16 Non-Trafficable System

A roof system that is not designed to support foot traffic. No standing, kneeling, or loading is permitted on these surfaces.

3.3.17 Licensed Electrician

A person holding a current electrical licence in the jurisdiction where the work is carried out, authorised to perform electrical installation and testing.

3.3.18 NCC

National Construction Code of Australia.

4 Disclaimer and Liability

4.1 General Disclaimer on Use of Information

This manual does not replace project-specific engineering, local building codes, electrical regulations, or site safety procedures.

It is the responsibility of the installer, designer, contractor, and building owner to check that:

- The product is suitable for the intended use.
- All work complies with current laws, standards, and approvals.
- Installation is carried out by appropriately qualified and licensed people.

Augenium is not liable for any loss, damage or injury arising from incorrect use of this information, incorrect installation, or failure to follow relevant standards and regulations.

4.2 Responsibility of Installer / Owner

4.2.1 Responsibility of Installer

- Make sure you are qualified and follow all safety rules.
- Check the roof and structure are suitable before starting.
- Install AURE x Helios Roof Panels exactly as shown in this manual and the project drawings.
- Use only approved components and fixings.
- Ensure all work complies with current Australian Standards, electrical regulations, and building codes.

4.2.2 Responsibility of Owner

- Make sure the product is used only for its intended purpose.
- Keep this manual and all project documents for future reference.
- Arrange regular inspections and maintenance as recommended.
- Use qualified tradespeople for any repairs, changes, or electrical work on the system.

4.3 Limitations of warranty when installation instructions are not followed

The Augenium warranty only applies when the AURE x Helios Roof Panels are:

- Installed exactly as described in this manual and the project drawings, and
- Used with approved components and within the stated limits.

If installation instructions are not followed, or non-approved methods or parts are used:

- The product warranty may be reduced, refused or void, and
- Augenium will not be responsible for any leaks, damage, loss of performance, safety issues or other faults that result.

4.4 Note Regarding Use for TÜV Certification and Local Australian Standards

This manual forms part of the documentation used to support TÜV certification of the AURE x Helios Roof Panels. The product must be installed in the same way as the tested roof build-ups and details. Any major change to the roof build-up, fixing method or system layout may affect the product's compliance and fire or safety performance.

TÜV certification does not replace the need to comply with:

- the National Construction Code (NCC)
- relevant Australian Standards
- local building and electrical regulations, and
- any requirements of the local authority or network operator.

It is the responsibility of the designer, installer, and owner to ensure that the final installation meets all Australian regulatory requirements, in addition to any TÜV conditions.

4.5 Regulatory Compliance

All AURE x Helios Roof Panel installations shall comply with:

- The National Construction Code (NCC)
- Relevant Australian Standards (structural, roofing, fire and electrical)
- Work health and safety (WHS) laws and site safety rules
- Local council, building authority and network operator requirements

This manual does not replace any of these regulations. If there is a conflict between this manual and a law, code or standard, the law, code or standard must take priority.

5 Safety Information

5.1 General Safety Principles for PV and Roofing Work

Working with PV systems and on roofs is hazardous. The following general principles apply to all work with AURE x Helios Roof Panels:

Work at height is high risk

- Use fall protection (guardrails, scaffolds, harness, and lifeline) as required.
- Keep clear of roof edges, skylights, and fragile surfaces.
- Do not work alone where there is a risk of falling.

PV modules can be live when exposed to light

- Treat all PV wiring and connectors as live DC when panels are in daylight.
- Never disconnect plugs under load unless the system is safely isolated.
- Use insulated tools and follow lock-out / tag-out procedures.

Use competent, trained personnel only

- Roof installation to be carried out by experienced roofing contractors.
- All electrical work must be performed by a licensed electrician.
- Supervisors must be familiar with PV and working-at-heights requirements.

Follow site WHS rules and method statements

- Work in accordance with the site safety plan, SWMS / JSA and risk assessments.
- Use required PPE (helmet, harness, gloves, safety glasses, safety footwear, etc.).
- Stop work if conditions become unsafe (high wind, storm, poor visibility).

Manual handling and glass handling

- Use correct lifting techniques and team lifts or mechanical aids for heavy panels.
- Handle glass edges carefully to prevent cuts and damage to the modules.
- Do not place tools or heavy objects on the panel surface.

Housekeeping and access

- Keep roof areas tidy and free of loose materials, offcuts, and trip hazards.
- Keep clear access routes to ladders, walkways and emergency exits at all times.

These general principles apply in addition to the specific warnings and instructions given in the following sections of this manual and in project-specific safety documentation.

5.2 Applicable, IEC, and Local Standards (Placeholder List to be Finalised with Augenium)

AURE x Helios Roof Panels must be installed in line with all applicable product, electrical, building and safety standards. For each project, the exact list is to be confirmed with Augenium, but will normally include:

- TÜV certification and fire test standards for the roof panel system
- IEC standards (e.g. PV module safety and performance)
- Australian electrical standards (e.g. AS/NZS 3000, AS/NZS 5033)
- Building and fire requirements under the NCC and referenced Australian Standards
- Work health and safety (WHS) laws and site safety rules

If there is any conflict between this manual and a standard or regulation, the standard or regulation must take priority.

5.3 Electrical Safety – Work by Licensed Electrician Only

AURE x Helios Roof Panels generate DC electricity whenever exposed to light. PV cables and connectors can be live even when the main AC supply is off.

- All electrical design, wiring, isolation, and testing must be carried out by a licensed electrician.
- Treat all PV modules, strings, and connectors as live DC equipment.
- Do not open connectors, cut cables, or modify wiring unless you are a licensed electrician following a safe isolation procedure.
- Follow site lock-out / tag-out rules and all relevant electrical standards.

This manual does not provide wiring diagrams or detailed electrical procedures. The installing electrician must use project-specific electrical drawings and comply with current Australian Standards and regulations.

5.4 Working-at-Heights Safety (Fall Protection, Roof Access)

- Treat all roof work as high-risk and follow WHS and site rules.
- Use suitable fall protection (scaffolds, guardrails, harness, and anchors) before going near roof edges or fragile areas.
- Use only safe access (fixed ladders, stairs, scaffolds) and keep access paths clear of trip hazards.
- Do not stand on gutters or other non-structural items.

- Do not work on the roof in high wind, rain, storms, or slippery conditions.
- Only trained personnel with working-at-heights competence may work on the roof.

5.5 Fire Safety and Emergency Procedures

Keep combustible materials (packaging, rags, solvents) away from hot work and electrical equipment. Follow site rules for hot work permits (grinding, welding, cutting) near the PV roof.

Know the location of fire extinguishers, alarms, and evacuation routes before starting work. In case of fire or electric shock:

- Raise the alarm and evacuate as per site procedure.
- Do not attempt to extinguish an electrical fire with water or non-rated extinguishers.
- Only trained personnel may isolate the PV system and electrical supply.

After any fire or emergency event, the AURE x Helios Roof Panels and wiring must be inspected by a qualified person before the system is returned to service.

5.6 PPE requirements

The following PPE must be used as required by site rules, WHS legislation and the task being performed:

- **Head protection** – safety helmet when working on site or under overhead work.
- **Foot protection** – safety boots with non-slip soles suitable for roof work.
- **Eye protection** – safety glasses or goggles when cutting, drilling, grinding, or handling metal and glass.
- **Hand protection** – gloves suitable for handling glass, metal edges, and tools.
- **Fall-arrest PPE** – full-body harness, lanyard, and approved anchor points when a fall risk exists.
- **Hearing protection** – when using noisy tools or equipment as required by site rules.
- **Additional PPE** – respiratory protection, high-visibility clothing, or other items as specified in the project SWMS/JSA.

PPE is not a substitute for safe work methods or fall protection systems – it must be used together with the controls described in this manual and site safety documents.

5.7 Special warnings

5.7.1 Trafficable steel back sheet system (safe walking zones)

The steel back sheet panel is trafficable for controlled maintenance access only. It is not a general work platform.

- Walk only in the safe walking zones shown on the project drawings or marked on site.
- Step directly over ribs/supports, not in unsupported areas or near panel edges.
- Do not jump, run, or drop tools and equipment on the panels.
- Do not place ladders, stacked materials or heavy point loads on the PV panels.
- If there is any doubt about where it is safe to walk, do not step on the panels – use walkways or other access.

Incorrect walking or loading can cause damage to the AURE x Helios Roof Panels, water leaks, electrical faults and may void the product warranty.

5.7.2 Non-trafficable aluminium back sheet system (no-step zones)

The aluminium back sheet panel is non-trafficable. The PV panels are not designed to be walked on.

- Do not step, kneel, or sit on the AURE x Helios Roof Panels with aluminium back sheet at any time.
- Treat all panel surfaces as “NO STEP” zones – use only dedicated walkways, platforms, or adjacent non-PV roof areas for access.
- Do not place ladders, tools, materials, or equipment on the panels.
- Keep clear of panel edges, junction boxes, and cable entry points.

Standing or placing loads on the aluminium panels can cause cracking, water leaks, electrical damage and will likely void the product warranty.

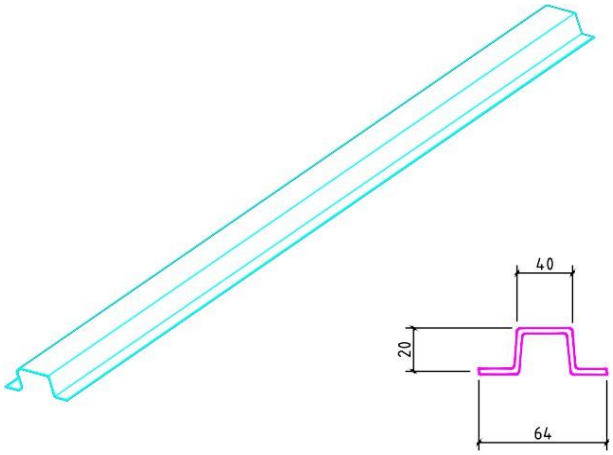
6 System Components, Performance and Part Identification

6.1 Mechanical components

Basic components for AURE x Helios panels installation are listed below.

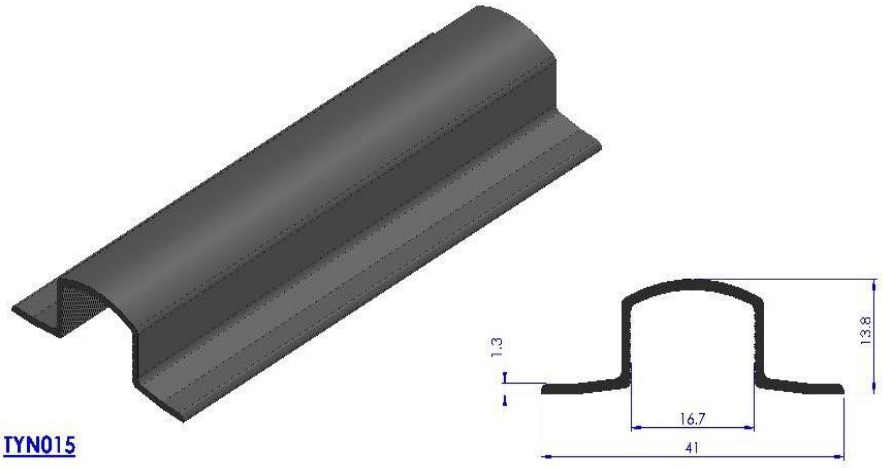
6.1.1 Zinc-coated Steel Purlins

Supplied by Augenium.



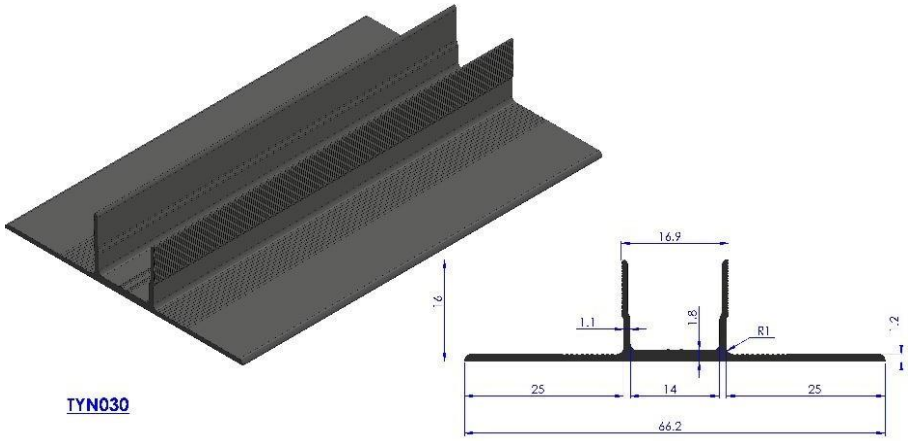
6.1.2 TYN015 π-type Aluminium Profile

Made of aluminium alloy, supplied by Augenium.

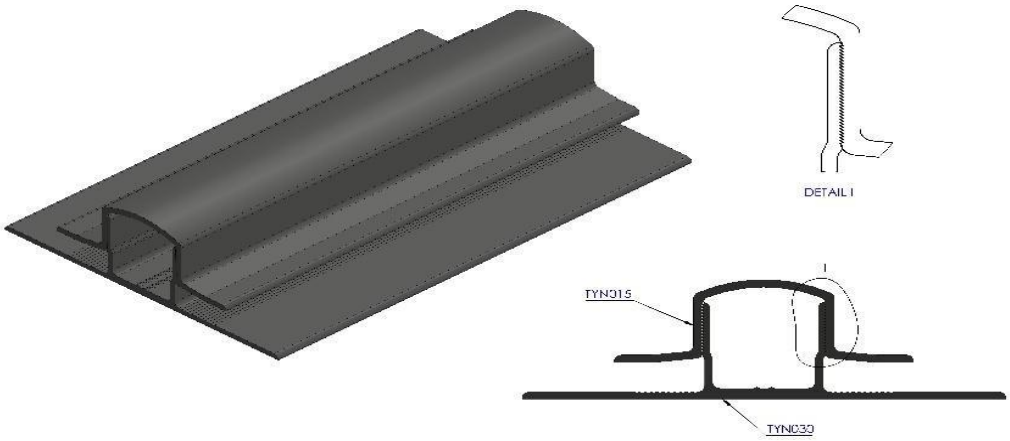


6.1.3 TYN030 Wineglass Type Aluminium Profile

Made of aluminium alloy, supplied by Augenium.



Assembled with TYN015 π-type aluminium profile as below



6.1.4 High-Performance Weatherproofing Silicone Sealant

High-performance weatherproofing silicone sealant is required for TYN015 and TYN030 connection. Guibao 1098 or similar model is recommended for application.

6.1.5 Stainless Steel Self-Tapping Screws

Min. 12g stainless steel self-tapping screws with a minimum length of 35mm.

6.2 Electrical Components (by Licensed Electrician)

The AURE x Helios Roof Panel system includes standard PV electrical components such as:

- factory-fitted junction boxes and connectors on each panel
- DC cables and terminations between panels and to the array junction points
- earthing / bonding hardware as required by the project design This manual does not provide electrical design, sizing, or wiring details.

All selection, layout, and installation of electrical components – including cable types and sizes, connector configuration, earthing, protection devices and connection to inverters or switchboards – must be carried out by a licensed electrician using:

- project-specific electrical drawings, and
- the current requirements of AS/NZS electrical standards and local regulations.

6.3 Mechanical Performance Parameters

The key mechanical performance parameters for AURE x Helios Roof Panels are specified in the product datasheet and project schedule. As a minimum, these include:

- **Panel dimensions** – overall length, width, and thickness of each panel type; glass thickness and backing plate thickness.
- **Weight** – panel mass (kg per panel and kg/m^2) for steel and aluminium variants, used by the structural engineer to check roof dead loads.
- **Walking load rating** – for the steel, trafficable system only, the tested walking / point-load rating and any restrictions on safe walking zones. The aluminium system is non-trafficable and has no walking-load rating.

Installers and designers must always refer to the current Augenium datasheet and project-specific documentation for actual values and ensure the roof structure and supports are designed for these loads.

6.4 Electrical Performance Parameters

Electrical Performance Parameters of AURE x Helios Roof Panels (with single crystalline N-type cells)

The rated electrical characteristics are within 5 percent of measured values at Standard Test Conditions (STC) of “1000 W/m2, 25 °C cell temperature and solar spectral irradiation of AM 1.5 spectrum”.

MODEL	AURE-RF-144-590N	AURE-RF-144-595N	AURE-RF-144-600N
Test Condition	STC	STC	STC
Maximum Power (Pmax / W)	590	595	600
Voltage at Pmax (Vmp / V)	42.97	43.12	43.26
Current at Pmax (Imp / A)	13.73	13.8	13.87
Open Circuit Voltage (Voc / V)	53.52	53.72	53.92
Short Circuit Current (Isc / A)	14.22	14.28	14.34
Module Efficiency (%)	23.02%	23.2%	23.4%
Glass Size	2272 × 1128 × 2.0 (Finished size: 2275 × 1200 × 3.8)		

STC: Irradiance 1000 W/m², Cell Temperature 25°C, Spectrum AM1.5

Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at Standard Test Conditions. The requirements of the National Electrical Code (NEC) in Article 690 shall be followed to address these increased outputs. In installations not under the requirements of NEC, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor ampacities, overcurrent device ratings, and size of controls connected to PV output.

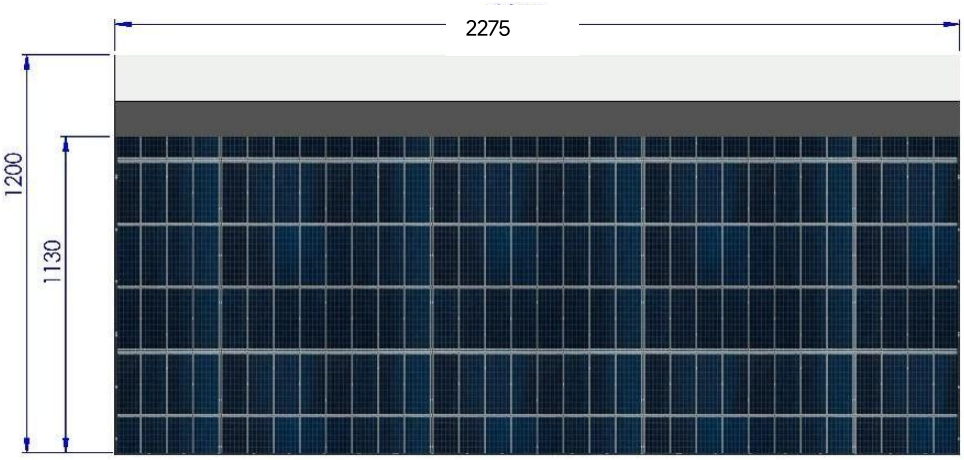
This manual does not provide string designs, wiring diagrams or detailed electrical calculations. Use of this electrical data (string sizing, inverter selection, protection devices, and cable sizing) must be carried out by a licensed electrician or electrical designer in accordance with:

- the Augenium datasheets and project electrical drawings, and
- the current AS/NZS electrical standards and local regulations.

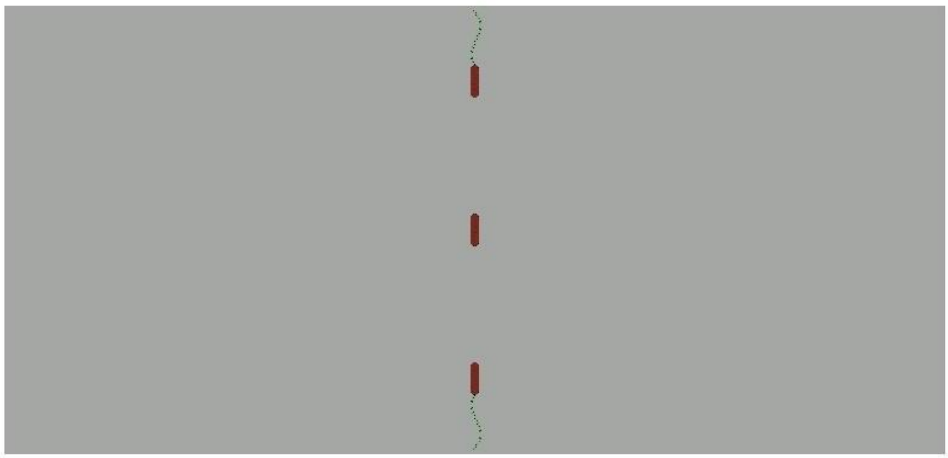
The electrical characteristics of the AURE-RF-144-590-600N photovoltaic modules are determined under Standard Test Conditions (STC) and may vary under real operating conditions. The values provided in this section are for reference and system design purposes only. Final electrical design and verification must be completed by a licensed electrician using project-specific calculations and applicable Australian Standards. The detailed electrical ratings for each module model are provided in the Augenium datasheet (Appendix A).

6.5 Part Identification

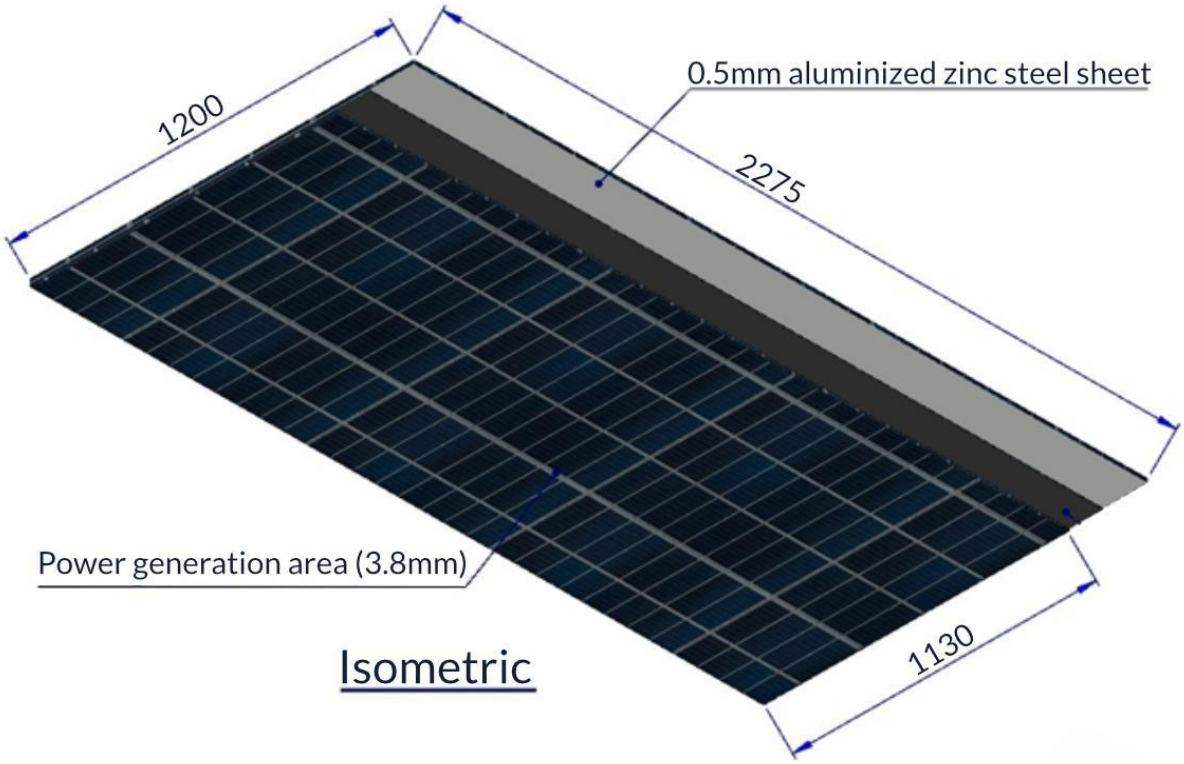
6.5.1 Photovoltaic Panels (AURE-RF-144-XXXN(=590~600)



Front View



Rear View FC-05 sOFT-Pack Silicone Gun



Note: When designing the drawing, the modulus can be designed based on the centre of the profile at 300 mm, with an upper and lower modulus of 1150 mm. When installing the product, the actual size of the on-site finished product shall prevail.

7 Environmental Conditions and Site Selection

7.1 Suitable Climatic and Environmental Conditions (Temperature Range, Wind, Snow, Corrosion Environments)

AURE x Helios Roof Panels must only be used in conditions that match the product datasheet and project design. In general:

Temperature:

- Use within the operating temperature range specified in the Augenium datasheet, with a rated T98 operating temperature limit of 70°C.
- Geographic application restrictions apply. Tropical zones, deserted regions, airtight roofs without ventilation, low-heat-dissipation colour steel roofs, and other areas with year-round high ambient temperatures shall be classified as high-T98-risk zones.
- For high-temperature zones, the following installation requirements shall apply:
  - (a) A ventilation and heat dissipation gap of at least 15cm shall be maintained beneath the modules. Airtight installations, where modules are mounted directly against roofs or thermal insulation layers, are prohibited.
  - (b) The number of modules connected in series per string should be appropriately reduced to minimize the DC circuit temperature rise.
  - (c) Hollow heat-dissipating mounting brackets shall be used to prevent large-area contact between metal brackets and the roof, which may trap heat.
  - (d) A power derating margin shall be reserved in the system design to account for the reduction in actual output performance under high-temperature conditions.

High Altitude:

- The maximum rated applicable altitude of this module is 2000 meters.
- When the installation altitude exceeds 2000 meters, air dielectric strength decreases, so power and voltage derating shall be implemented for the system. The system DC power shall be derated by 5% for every additional 1000 meters of altitude. Meanwhile, the voltage withstand compatibility of inverters and connectors shall be rechecked. It is recommended to reduce the number of modules per string in ultra-high-altitude areas.

Wind and snow:

- Existing and new roof structures, including all fixings, must be designed to withstand site-specific wind loads and, where applicable, snow loads, in addition to the dead loads imposed by the AURE x Helios panel system, in accordance with the NCC and relevant Australian Standards.
- Additional steel purlins and fixings may be required depending on local design conditions and should be confirmed through engineering assessment.

- The system must not be installed in locations where the design loads exceed the certified performance limits.

Corrosion environment:

- Select panel, backing and fixings suitable for the site corrosion category (e.g. inland, industrial, coastal, severe marine).
- Additional protection or alternative materials may be required in harsh or marine environments. Routine inspections are strongly recommended.

If site conditions fall outside the published limits, the design must be reviewed and approved by Augenium and the project engineer before installation.

7.2 Roof Structural Suitability and Load-Bearing Capacity

- The existing or new roof structure must be checked and certified by a qualified structural engineer as suitable for:
  - the dead load of the AURE x Helios Roof Panels and fixings
  - live loads (maintenance access where applicable)
  - wind, snow (if applicable) and seismic loads to the relevant Australian Standards.
- Purlin spacing, sheet thickness, fixings, and any secondary framing must meet the requirements of:
  - structural safety against design loads and deflection limit, and
  - not exceed the design limits given in AURE x Helios product technical data.
- Do not install AURE x Helios Roof Panels on roofs that are damaged, corroded, or inadequately secured, as such conditions may compromise structural integrity under the additional design loads.
- Confirmation of structural adequacy is the responsibility of the project structural engineer and building owner, not this manual.

7.3 Roof Orientation and Shading Considerations

Orientation

- For optimal energy yield in Australia, panels are typically installed on north-facing roof areas, unless otherwise specified by the project electrical designer.
- East-, west- and south-facing orientations may be utilised where necessary, noting that these will result in reduced or time-shifted energy generation profiles.

Shading

- Avoid shading from nearby buildings, parapets, plant, trees, antennas, or other rooftop equipment.
- Persistent or significant shading can adversely impact system output and may affect string configuration and inverter performance.

Final determination of roof pitch, orientation and acceptable shading conditions shall be the responsibility of the project designer or electrical engineer, based on site-specific analysis and modelling.

8 Installation – General Requirements

8.1 Qualifications of Installers (Roofing + Licensed Electricians)

Installation of AURE x Helios Roof Panels must only be carried out by suitably qualified electricians:

Roof installation

- Performed by qualified electrical contractors, preferably with roofing projects.
- Installers must be competent in working at heights, metal roof installation, flashing, and waterproofing to Australian Standards.

Electrical work

- All electrical design, wiring, isolation, testing, and commissioning must be performed by a licensed electrician (and, where required, an electrical engineer).
- Electricians must be CEC listed and proficient in current AS/NZS electrical standards.

Training and familiarisation

- Installers and electricians must read this manual, relevant Augenium datasheets and project drawings before starting work.
- Any uncertainties must be clarified with Augenium or the project designer prior to installation.

8.2 Tools and Materials Required

The exact tools and materials will depend on the roof type and project details, but as a minimum the following are typically required for installing AURE x Helios Roof Panels:

Hand and power tools

- Tape measure, chalk line, spirit level
- Markers, scribes, and tinsnips/shears
- Cordless drill/driver with suitable bits and sockets
- Impact driver (if specified for roofing screws)
- Rivet gun (if project details require rivets)
- Sealant gun for cartridges and/or sausages
- Spanners, screwdrivers, and general hand tools

Lifting and access equipment

- Roof access ladder, scaffold, or platform (as per site safety plan)
- Panel lifting aids, suction lifters or team-lifting arrangements

- Fall-arrest equipment (harness, lanyard, anchor points) as required

Roofing materials

- AURE x Helios Roof Panels (correct types and quantities)
- Compatible metal roof sheeting (where part of the scope)
- Support profiles, trims, and flashings as per project drawings
- Approved roofing fasteners (self-drilling screws, clips, washers)
- Specified butyl tapes, gaskets and neutral-cure sealants

8.3 Handling, Storage and Transport of Modules

AURE x Helios Roof Panels must be handled with care to avoid damage and injury.

Handling

- Always lift panels carefully – do not drag or slide them across hard surfaces or other panels.
- Use two-person lifts or suitable lifting aids for larger or heavier panels.
- Hold panels by the frame or backing edges where possible, not by junction boxes or cables.
- Do not stand, sit, or place tools or materials on the glass surface.
- Inspect panels for visible damage (cracks, chips, delamination, damaged back sheets, or junction boxes) before installation. Do not install damaged panels.

Storage

- Store panels in their original packaging on a firm, level surface.
- Keep pallets dry, clean, and protected from rain, standing water, impact, and direct ground contact.
- Do not stack pallets or loose panels higher than recommended on the packaging or delivery documents.
- Avoid locations with excessive dust, chemicals, or corrosive atmospheres.
- On-site handling and staging
- When unpacked, place panels on soft, non-abrasive supports (e.g. padded bearers) and secure against slipping.
- Do not leave loose panels where they may be blown over by wind or knocked by other work.

- Keep panels clear of active work areas to avoid accidental impact from tools, materials, or foot traffic.

Any panel suspected of being damaged during transport, storage or handling must be quarantined, clearly marked, and reported to the site supervisor and Augenium before proceeding.

8.4 Pre-Installation Checks on Roof and Structure

Before starting any installation work with AURE x Helios Roof Panels, the installer must make sure that:

Working-at-heights controls are in place

- Roof access is safe (ladder, scaffold, stairs, or platform as per site rules).
- Fall protection (guardrails, mesh, harness, and anchors) is installed where required.

The work area is safe and clear

- Roof surfaces are dry and not slippery.
- There are no loose materials, holes, fragile areas, or obvious trip hazards in the work zone.

Weather conditions are suitable

- No work is carried out in high wind, heavy rain, storms, or poor visibility.

Site safety rules are understood

- All workers know the site induction, SWMS/JSA and emergency procedures.
- Fire exits, first-aid points and rescue arrangements for roof work are known.

If any safety control is missing or conditions are not safe, do not start installation until the issue is corrected and confirmed by the site supervisor or principal contractor.

8.5 Waterproofing Principles Common to All Systems

- The existing roof sheeting or membrane must stay as the main waterproof layer.
- Only install panels over sound, watertight roof areas.
- All joints and flashings must shed water down-slope (no reverse laps).
- Use the sealants, tapes, flashings, and fixings specified in the project details.
- Keep drainage paths (pans, gutters, valleys) clear – do not block them with brackets, cables, or sealant.

If you are unsure about any roof detail or penetration, stop and confirm with the roofing designer or Augenium before continuing.

8.6 Mechanical Design Load Rating

Here is a summary regarding the Positive (“+” or downward) and negative (“-” or upward) mechanical design load ratings in Pa, excluding test load safety factor:

- Max static design load front/snow load: +3600Pa
- Max static design load back/wind load: -2400Pa

Please refer to Appendix A: AURE x Helios Roof Panel Datasheet (AURE-RF-144-XXXN) for more details.

8.7 Electrical Connection of Modules

Modules may be connected in series and/or parallel configurations. In series configuration, a maximum of 2 modules shall be connected in one string. It is strictly prohibited that the total open-circuit voltage of a single string exceeds the maximum DC input voltage of the inverter. In parallel configuration, the number of parallel branches per MPPT channel shall not exceed the rated upper limit of branches specified by the inverter. The quantity of series-connected modules within each branch shall be identical. Mix-series and mix-parallel connection of PV modules with different power ratings or models are prohibited. Reversed connection of module positive and negative poles is forbidden. The DC circuit must be disconnected prior to wiring operations.

Field wiring connectors supplied with this PV module may only be mated and plugged with connectors of the same manufacturer, identical model, and equivalent rated voltage/current specifications. Mixing connectors of other brands or different specifications is strictly prohibited. Cross-brand or cross-specification mating will lead to excessive contact resistance, overheating, arcing, and insulation failure, thereby creating potential safety hazards including fire and electric shock.

The minimum specification for the DC output cable used with this PV module is a 2.5 mm^2 PV-specialized cable made of oxygen-free electrolytic copper with a tin-plated surface. The conductor consists of stranded, fine-wire construction and is rated for a long-term ambient temperature range of -40°C to +90°C, with a maximum long-term operating temperature of 120°C. This cable meets the requirements for current-carrying capacity, temperature rise, and voltage drop under the module's maximum short-circuit current conditions.

The minimum bending radius of cables exiting the module junction box shall be no less than 5 times the outer diameter of the cable; sharp folding and extrusion of cables are prohibited. Excessive coiling of cables inside the junction box is forbidden. The reserved cable length shall not exceed 30 cm to avoid heat accumulation within the box. Only the DC cables corresponding to this module are allowed to be laid in a single loop inside conduits and trunking; mixed laying of strong current and weak current cables in the same conduit is prohibited. Cables inside combiner boxes shall be arranged in separate zones; positive and negative cables shall be isolated in separate grooves. The tightening torque of terminals must strictly comply with accessory manual requirements, and loose connections are strictly forbidden.

This PV module is a Class II safety protection product that relies on a double insulation structure for electric shock prevention, without relying on earthing as primary insulation protection. Double insulation isolation is implemented between the module frame, back sheet, and circuit layers. There is

no risk of electric shock when touching the outer frame under normal operating conditions. Nevertheless, power cut-off operations must be performed before maintenance with the DC circuit disconnected, and plugging/unplugging connectors under load is prohibited.

All electrical work associated with the installation of the AURE x Helios Roof Panels shall be carried out only by a licensed electrician.

Electrical connections must be designed, installed, inspected, and tested in accordance with the requirements of AS/NZS 3000 – Electrical Installations (Wiring Rules) and all other applicable Australian Standards and local regulatory requirements.

The installer is responsible for ensuring that:

- All DC and AC wiring are correctly sized, protected, and installed to suit the system rating and environmental conditions.
- Appropriate isolation devices are installed and clearly labelled to enable safe operation, maintenance, and emergency shutdown of the PV system.
- Earthing and bonding of PV modules, mounting structures, and associated equipment are completed in accordance with the Wiring Rules.
- Overcurrent protection and fault protection measures are implemented as required.
- All required inspection, testing, and verification procedures are completed before system energization.

Failure to comply with these requirements may result in unsafe operation, equipment damage, or non-compliance with Australian electrical safety regulations.

8.8 Earthing and Grounding of PV Modules

Earthing and bonding of the photovoltaic (PV) array and associated metallic components shall be performed only by a licensed electrician and must comply with the requirements of AS/NZS 3000 – Electrical Installations (Wiring Rules) published by Standards Australia, together with all applicable Australian Standards and local regulatory requirements.

This manual does not provide detailed earthing system design. The responsibility for the design, installation, and verification of the earthing system rests with the licensed electrical installer.

The installer shall ensure that:

- All exposed conductive parts of the PV system, including module frames, mounting structures, cable trays, conduits, and metallic enclosures, are effectively bonded to the installation earthing system.
- Earthing conductors are correctly sized, mechanically protected, and installed in accordance with the Wiring Rules.
- Equipotential bonding is provided to minimize touch voltage and ensure effective fault current paths.

- The complete earthing system is tested and verified before commissioning, including continuity and resistance checks using appropriate test instruments.

9 Installation

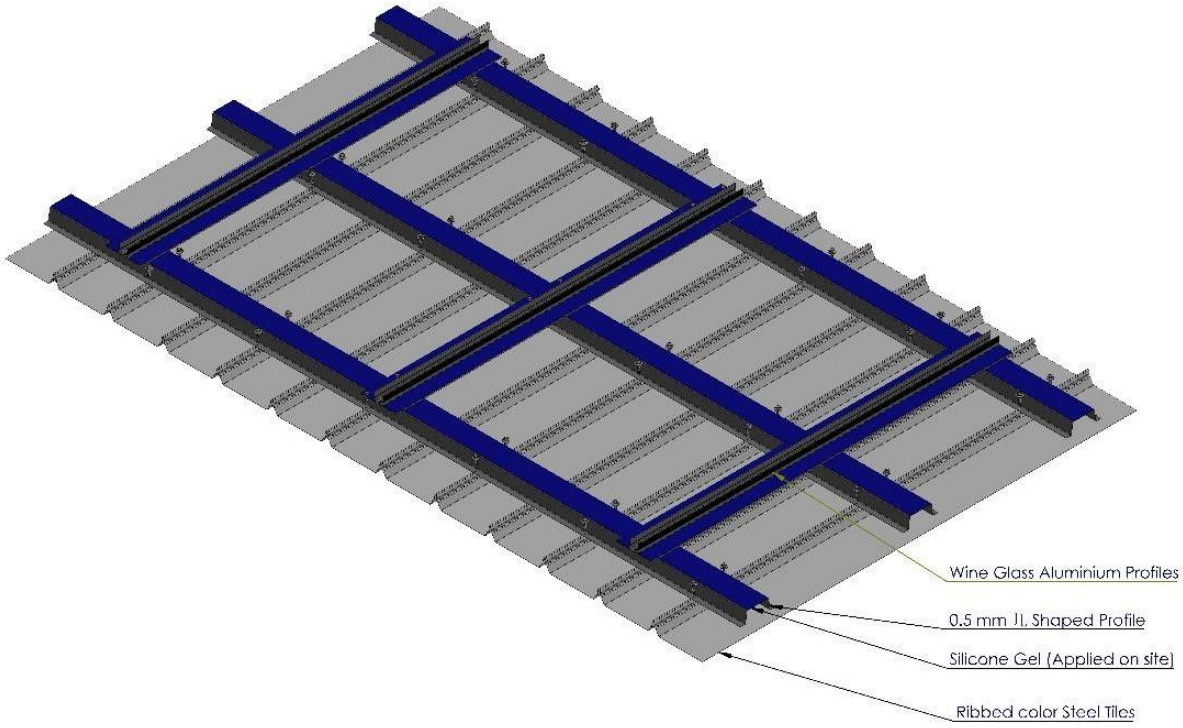
9.1 Purlin Installation

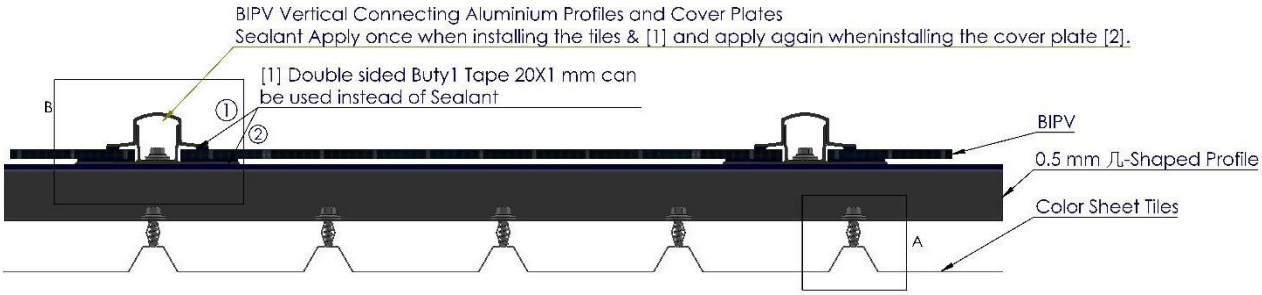
Purlins shall be installed in accordance with the approved design dimensions. A minimum of three steel purlins is required for installations in non-cyclonic regions (A1–A7 and B1 in accordance with AS 1170.2). The minimum spacing between the first and second purlins shall be 610 mm, and between the second and third purlins 540 mm, with a total centre-to-centre distance of not less than 1150 mm between the first and third purlins.

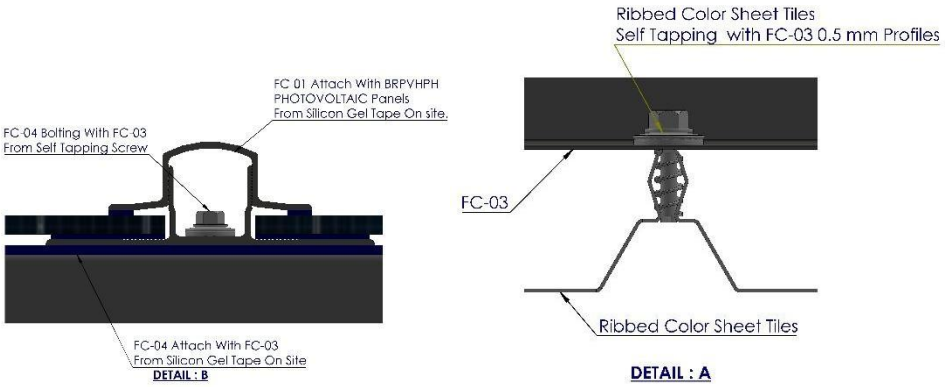
Additional purlins may be required to accommodate higher wind loads, subject to site-specific conditions. The final purlin layout and spacing must be reviewed and approved by a qualified engineer prior to installation.

The spacing of purlins shall be reviewed and approved by qualified engineer before installation.

Purlins shall be fixed to the roof corrugations using self-tapping screws, with one screw installed at every second corrugation. An EVA sealing strip shall be applied to the ∏-shaped purlins to ensure proper sealing and weatherproofing.











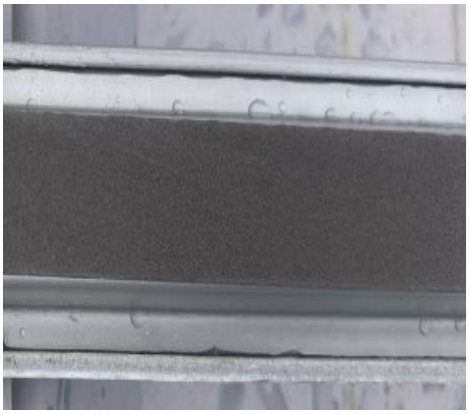
INSTALLING PURLIN ON THE ROOF

Use purlin blocks for support and maintain a consistent pattern, proper alignment is crucial to ensure the structural integrity and a level, durable roof.



OVERVIEW OF PURLINS INSTALLED ON THE ROOF

This is how the roof look after all the purlins is installed. These Purlins function as horizontal structural members installed on roofs, running parallel to the eaves and perpendicular to rafters to provide secondary support for roofing sheets or panels



CONTINUOUS EVA STRIP

Install EVA seals, such as high-density foam or butyl tape, are between purlins and roofing sheets to create a watertight barrier and reduce noise from thermal expansion. These seals are crucial for preventing leaks and stopping metal-on-metal friction. They are typically applied directly to the purlin top before fastening the panels

9.2 DC Cable Placement

9.2.1 Cable Preparation

According to the drawing dimensions and the on-site distance from the BIPV output terminal to the inverter, prepare cables of the corresponding length and label them in sequence.

9.2.2 MC4 Connector Installation

First, strip the cable to the appropriate length using a wire stripper. Then crimp the conductor core using a crimping tool. Finally, insert it into the MC4 connector and tighten it using a dedicated spanner.

After completing the MC4 connections, place them at the photovoltaic panel installation location for use.



These are metal connectors used to establish a secure electrical connection to a feedthrough or plug connector. They require a specific crimp tool for installation.



The image shows a pair of MC4 solar panel wire connectors.



After the purlins are installed, the cables are laid out as shown above



This image shows the workers getting ready to install photovoltaic panels onto aluminium mounting rails.

9.3 Wineglass Type Aluminium Profile Installation

The wineglass type aluminium profiles must be fixed onto the purlin using self-tapping screws. All joints must be positioned directly over the purlins.

Apply butyl sealing tape on both sides of the wineglass type aluminium profiles (the butyl tape must be applied smoothly and firmly, without wrinkles). The inner edge-to-inner edge spacing shall be around 2278 mm for next step to place solar panels.

This step can be carried out simultaneously with the photovoltaic panel installation.



Profile mounted with self-tapping screws

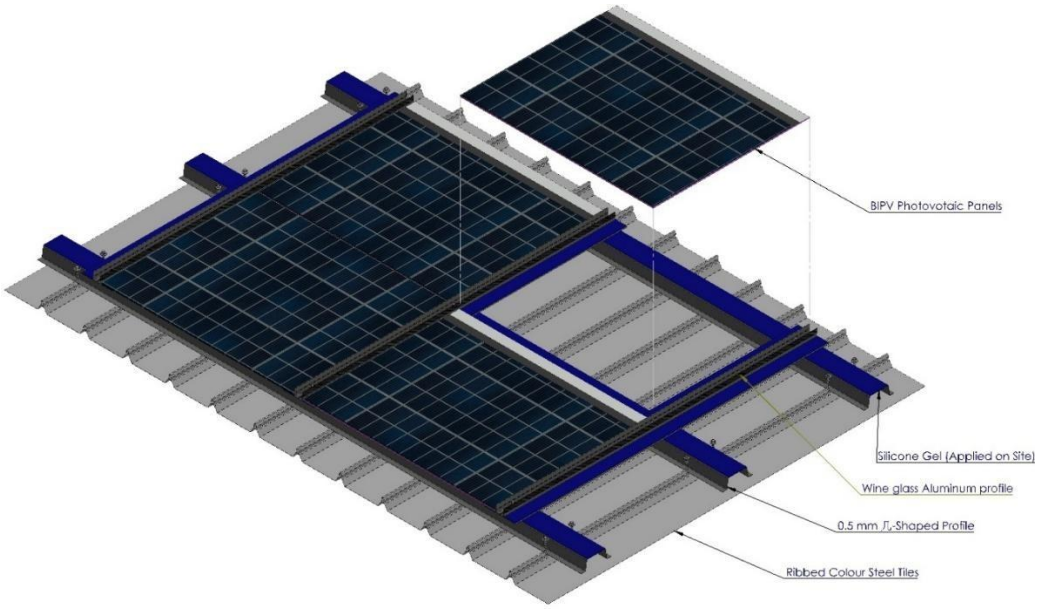


Profile mounted with a self-tapping screw



After installation of wineglass type aluminium profile

9.4 Photovoltaic Panel Installation



9.4.1 Application of Butyl Tape

Apply two continuous butyl tapes to the upper end of the photovoltaic panel. No wrinkles are permitted.

9.4.2 Panel Installation

Two workers shall lift and position the panels together. Install sequentially from bottom to top.

During installation, conduct self-checks to ensure there is no displacement, confirm that lap joints are positioned over the purlins, and verify that the panels are securely fixed. Ensure that all the solar panels will sit on the steel purlins.



Apply butyl tapes to the upper end of the photovoltaic panel



Two workers installing the panel

9.4.3 Fixing with Self-Tapping Screws

Use flat-head self-tapping screws to secure the AURE x Helios Roof Panels to the wineglass type aluminium profiles. After fastening, remove all metal debris to prevent electrochemical corrosion. Clamps are not recommended for installation.

After installation is completed, measure the open-circuit voltage to confirm it is correct and verify proper grounding.



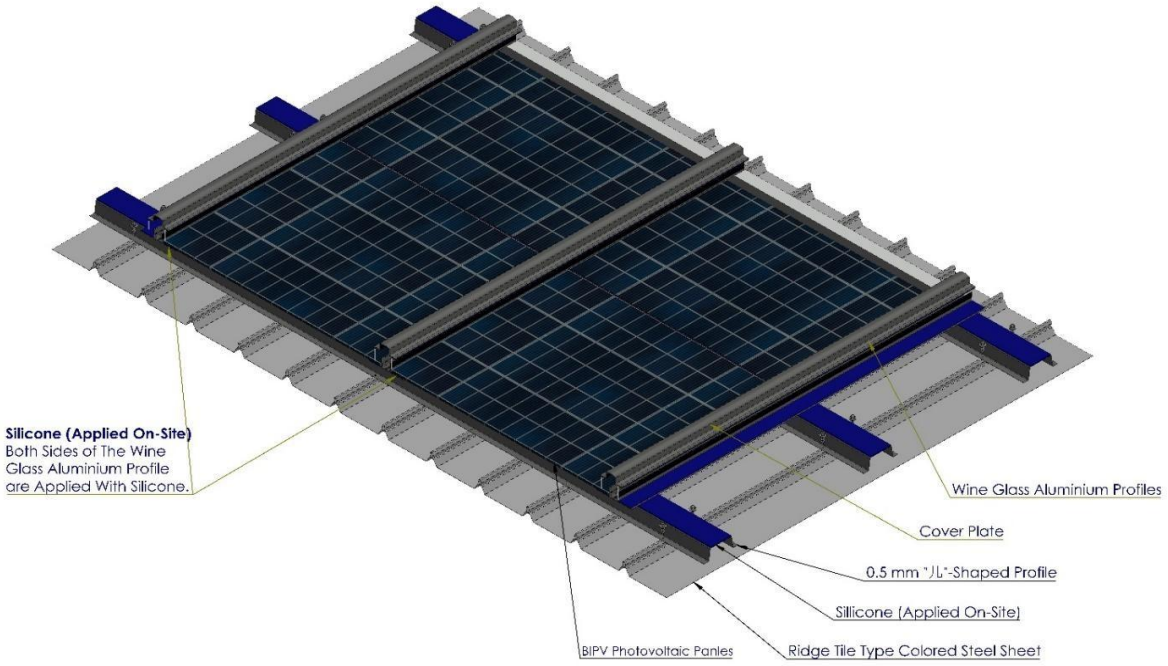


Fixing the self-adhesive tape



The item shown is a clamp meter to identify electrical measurements

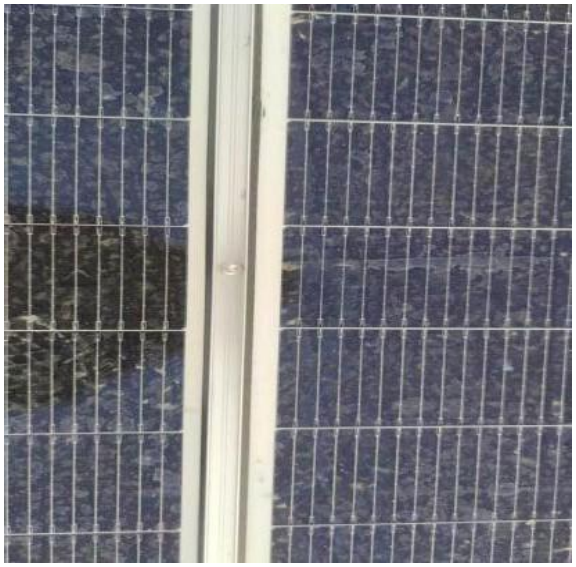
9.5 Sealant Application



High-performance weatherproof silicone sealant to be applied at the joint between the wineglass type aluminium profiles and the solar panels.

- The silicone sealant shall be applied evenly and smoothly. The joint must be fully filled and level with the module surface.
- During application, take care to avoid applying structural sealant onto the surface of the photovoltaic panel.





This image depicts a technician applying sealants to solar panels to ensure waterproofing

9.6 π-type Aluminium Profile Installation

- The π-type cover plate must have self-tapping screws for structural connection at the ends, joints, and eaves of the roof ridge.
- The cover plate must be tightly fastened to the wineglass type aluminium profile.









Construction Instructions:

- After installation, the BIPV panels shall be securely bonded to the roof corrugations. Panels shall not be walked on until the adhesive has fully cured; only then may access be permitted to apply the wineglass–shaped aluminium profile adhesive.
- Apply silicone sealant continuously along both sides of the interface between the wineglass shaped aluminium profile and the BIPV panel. Install the snap-on π-shaped cover plate immediately before the sealant cures to ensure proper bonding and sealing.
- Continuous silicone sealant shall be maintained on both sides of the aluminium profile to seal the interface between the cover plate and the glass, providing long-term fixation and weatherproofing of the π-shaped cover plate.

9.7 Recommended Construction Tools

NO.	TOOL NAME	PURPOSE	REMARKS
1.	Crimping pliers	Terminal crimping	
2.	Automatic wire stripper	DC cable stripping	
3.	PV crimping tool	MC4 inner core crimping	
4.	MC4 spanner	MC4 connector installation	

5.	Hand drill	Self-tapping screw installation and rivet hole drilling
6.	Heat gun	Heat shrink terminals
7.	Multimeter	Continuity testing and grounding testing
8.	Screwdriver, voltage tester	Temporary power connection
9.	Angle grinder	Edge material cutting
10.	Welding machine	Auxiliary work (fabrication of temporary ladder, cable rack, etc.)
11.	Steel tape measure	Measurement
12.	Sealant gun	Sealing

10 Commissioning and Handover

10.1 Pre-Commissioning Mechanical Checklist

After the AURE x Helios Roof Panels are fixed to the roof purlins with self-tapping screws, all metal debris must be removed to prevent electrochemical corrosion.

At the ends, joints, ridge and eaves, the cover strip must be structurally fixed using self-drilling screws and securely clipped onto the lower edge strip.

Structural sealant at the joint between the lower edge strip and the AURE x Helios Roof Panels shall be applied evenly and smoothly, fully filling the joint and remaining level with the module surface.

10.2 Electrical Tests and Measurements

After installation is completed, the open-circuit voltage of the BIPV string is measured to confirm it is correct, and proper grounding is verified.

11 Operation and Maintenance

11.1 Routine inspection schedule (roof, sealants, fixings, wiring)

Conduct annual inspections to ensure the following:

- Joints and connectors are secure and free from wear or corrosion.
- Grounding connections are intact and effective.
- Installation brackets are stable and free from loosening.
- Modules are clean and free of obstructions like dirt, leaves, or snow.

11.2 Cleaning procedures and acceptable cleaning agents

AURE x Helios solar products feature the advantage of operation & maintenance-free performance. The frameless design of the modules prevents dust accumulation.

For modules installed at an angle, natural rainfall often suffices to clean the surface. If additional cleaning is required:

- Use a soft cloth or sponge with water to clean the glass surface gently.
- Avoid using abrasive materials or tools to prevent scratches that could impact power output.
- If using high-pressure cleaners, follow these guidelines:
    1. **Cleaning Fluid**: Use clean water at ambient temperature; avoid chemical cleaners.
    2. **Water Pressure**: ≤ 13.1 MPa.
    3. **Flow Rate**: ≤ 7 L/min.
    4. **Nozzle Distance**: Maintain a distance of ≥ 30 cm from the module surface.
    5. **Spraying Angle**: Keep the angle ≥ 15° to avoid damage.
    6. **Timing**: Clean during low-light conditions, such as at night or early morning, to reduce the risk of thermal stress.

11.3 Record-keeping templates (maintenance log)

The smart inverter enables remote monitoring of the operating status of each individual module, allowing real-time observation of module performance.

11.4 Shading

Partially blocking a single module can cause reverse voltage, affecting current flow through other modules and increasing the risk of damage.

- Ensure modules are free from obstructions (e.g., dirt, shading, or debris) to prevent reverse voltage build-up.

11.5 Electrical Safety

- Do not disassemble the junction box or modify internal components. Wiring methods must maintain the factory settings to avoid damage or safety risks.
- Never leave junction box connectors in a short-circuit condition.
- During maintenance, use appropriate safety devices such as:
  - **Insulated Tools and Gloves**: To prevent electric shocks.
  - **Shading Materials**: Cover the module's glass surface to reduce voltage production under sunlight.
- Be cautious when working on modules exposed to sunlight, as they can produce high voltage. Always observe proper safety protocols to avoid electric shocks.

12 Warranty

- **Product Warranty: 15 years**
- **Linear Performance Warranty: 30 years**

Appendix

Appendix A: AURE-RF-144-xxxN (590-600) Datasheet-0331

Augenium

PRODUCT SPECIFICATION

AURE x HELIOS ROOF SOLAR PANELS

AURE-RF-144-XXXN (XXX=590~600)

MECHANICAL SPECIFICATIONS

Model	AURE-RF-144-590N AURE-RF-144-595N AURE-RF-144-600N
Overall Dimensions	2275 x 1200 mm
Glass Size (±5 mm)	2272 x 1128 mm
Thickness (±0.5 mm)	3.9 mm
Gross Weight (±1 kg)	28 kg
Front Glass	2.0 mm AR-coated heat-strengthened glass
Back Sheet	0.5 mm high-strength Alu-Zinc steel sheet
Back Glass	2.0 mm AR-coated heat-strengthened glass
Cell Type	Mono-crystalline silicon, TOPCon
Cell Arrangement	144
Junction Box Type	AURE Thermal Bridge Junction Box
Junction Box (Protection Degree)	IP68
Connector	Changshu Friends Connector Technology Co., Ltd PV5e/PV3e Staubli Electrical Connectors AG PV-KST4/xy_UR, PV-KBT4/xy_UR PV-KST4-EVO 2/xy_UR, PV-KBT4-EVO 2/xy_EU
Per 40ft HC Container	690
Per Pallet	23

OPERATING SPECIFICATIONS

Max. System Voltage	1000 V
Max Fuse Rating	25 A
Max Static Load Front/Snow Load	+5400 Pa
Max Static Load Back/Wind Load	-3600 Pa
Hail Test Passed	25 mm dia, 23 m/s impact speed

*Clamps not recommended for installation

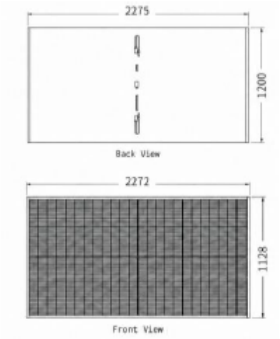
TEMPERATURE COEFFICIENT (STC)

NMOT	41 ± 3°C
Operation Temperature	T90max 70°C
Temp. Coeff. (Pmax)	-0.29% / °C
Temp. Coeff. (Voc)	-0.25% / °C
Temp. Coeff. (Isc)	0.045% / °C

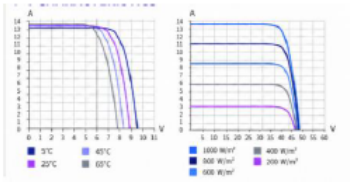
*Operating temperature in accordance with requirements of IEC 61215-1 for photovoltaic (PV) modules

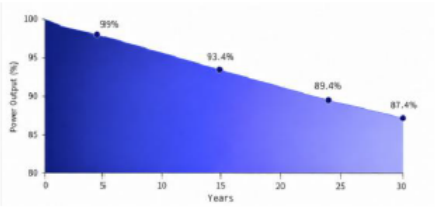
DIMENSIONAL DRAWING

UNIT: MM



IV CURVE & LINEAR PERFORMANCE WARRANTY





ELECTRICAL SPECIFICATIONS

Max Power (Pmax/W with Tolerance ±3%)	590/595/600
Voltage at Max Power (Vmp/V)	42.97/43.12/43.26 V
Current at Max Power (Imp/A)	13.73/13.80/13.87
Open Circuit Voltage (Voc/V)	53.52/53.72/53.92
Short Circuit Current (Isc/A)	14.22/14.28/14.34
Power Sorting	0-5 W
Module Efficiency (η)	23.02%/23.2%/23.4%
Test Conditions	STC

Standard Test Conditions (STC): Irradiance=1000 W/m², Cell Temperature 25°C, AM 1.5

15 YEARS Product Warranty *Full Terms and Conditions Apply

30 YEARS Linear Performance Warranty *Full Terms and Conditions Apply

CLASS A Fire Rating IEC61730 and UL790

CERTIFICATE HOLDER ClearVue Technologies Trading as Augenium

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