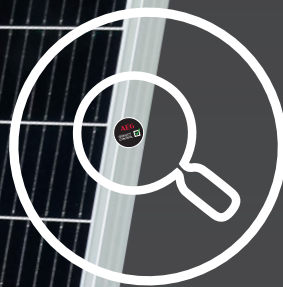


# AEG

AT A CLOSER LOOK:  
WHAT DOES IT TAKE  
TO MAKE AN AEG MODULE?



LOOKING INTO AEG  
QUALITY MANAGEMENT PROCESSES

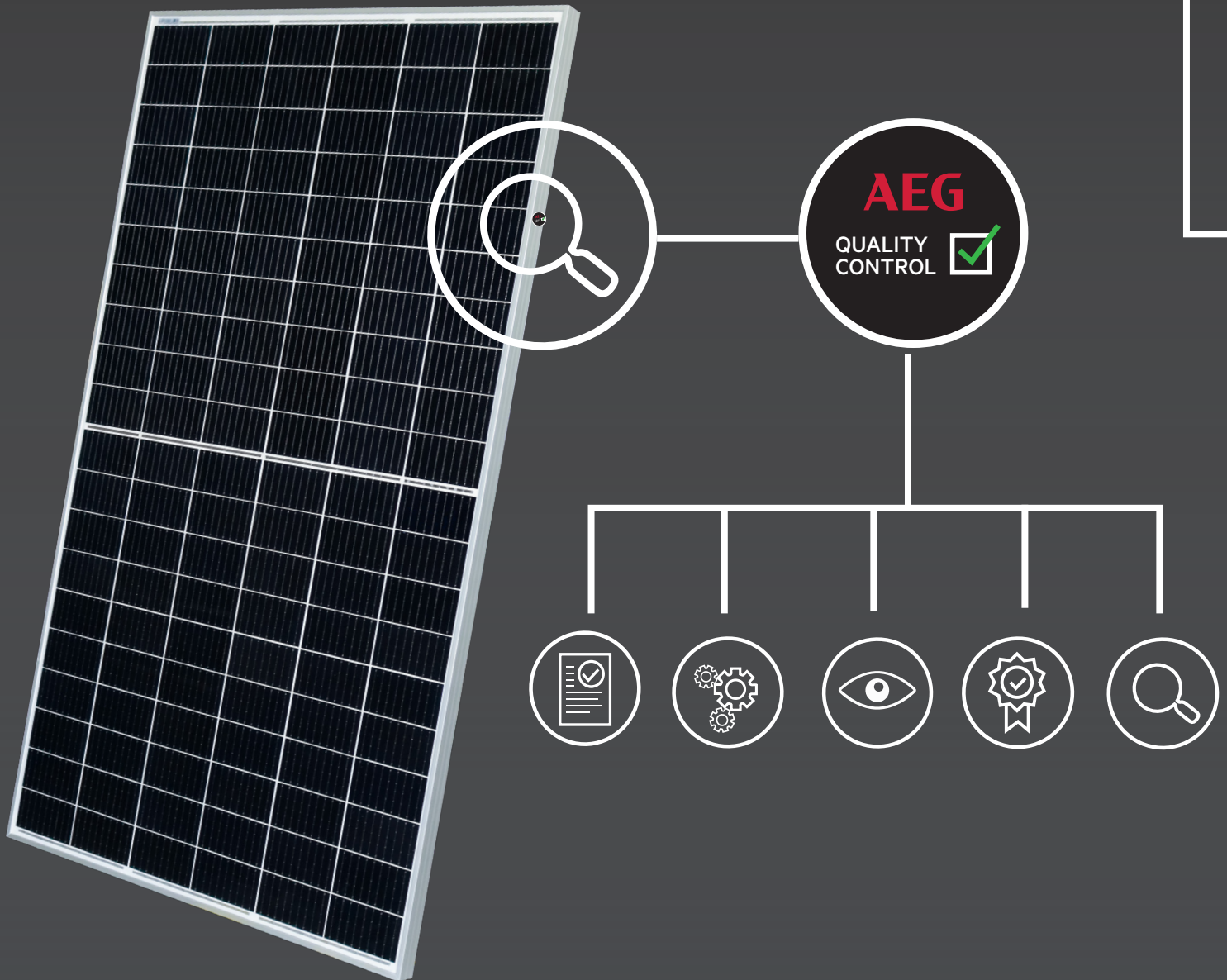
# AEG

## WHAT MAKES AN AEG MODULE?

AEG solar modules are made to last, and to deliver safely clean energy to household, commercial and utility installations over their whole lifespan.

This is possible thanks to advanced product design, to the accurate selection of components, and to exacting manufacturing standards.

But what does it take to make an AEG module?





...HERE'S WHAT IT TAKES:



## QUALIFIED SUPPLIERS

Solar Solutions only works with qualified suppliers who fulfill rigorous requirements. The assessment spans thorough bankability checks, back-to-back warranty capabilities, manufacturing capacity assessment, and process qualifications as issued by independent third-party certification bodies, including among others the standards Quality Management System ISO 9001, Environmental Management System ISO 14001, and Occupational Health and Safety OHSAS 18001.

Qualified suppliers must be authorized by Electrolux Group for the production of AEG solar modules, and undergo periodical inspections by the Solar Solutions Quality Control Team, the Electrolux Quality team and third party inspectors at all levels. The audited aspects include among others equipment calibration, traceability, production monitoring, documentation consistency, and purchasing processes.

- BANKABILITY
- MANUFACTURING CAPACITY
- BACK-TO-BACK WARRANTY
- CERTIFICATION ISO 9001
- CERTIFICATION ISO 14001
- CERTIFICATION OHSAS 18001
- ELECTROLUX & THIRD-PARTY ASSESSMENT

# AEG

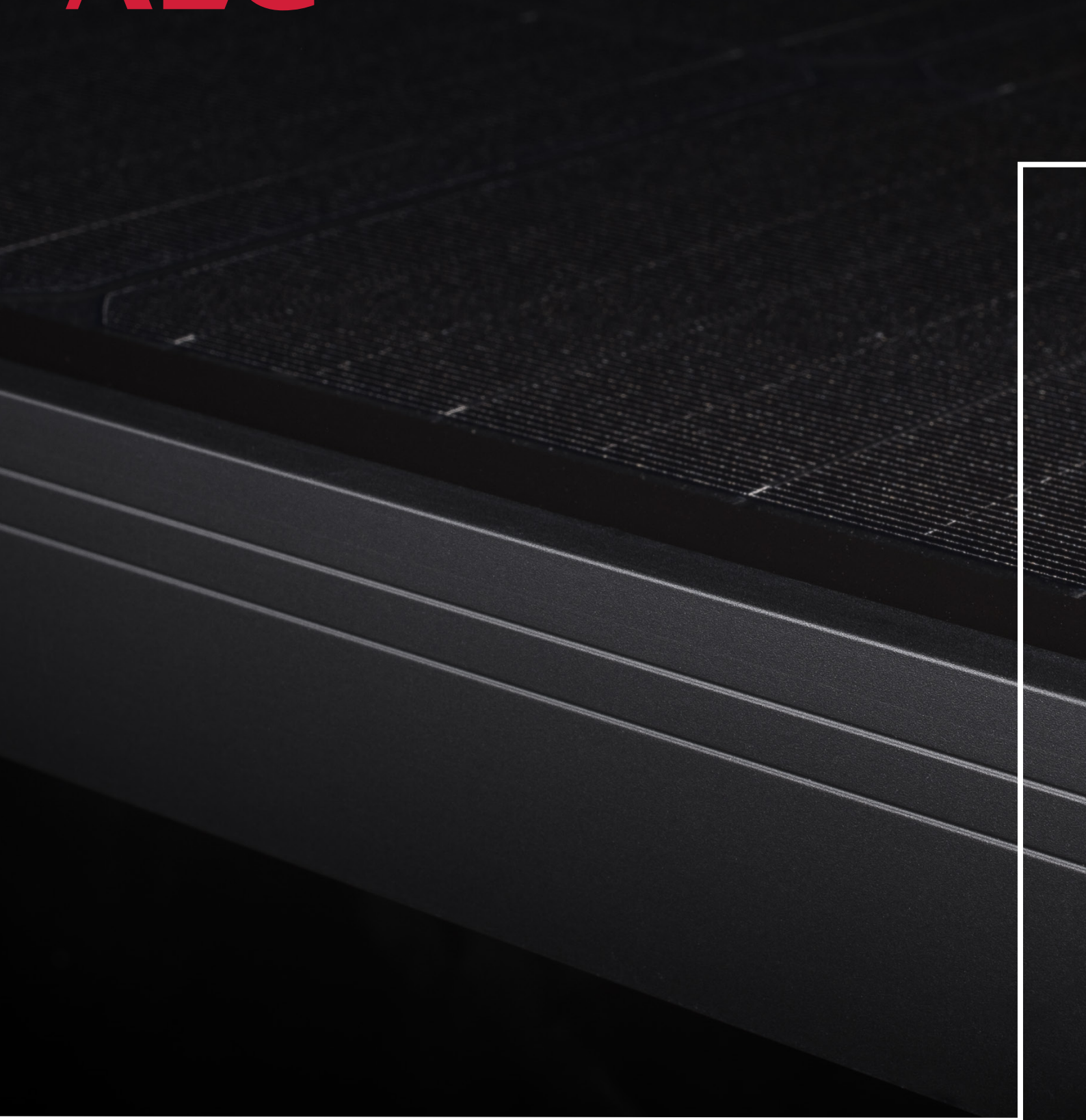




## STATE-OF-ART MANUFACTURING FACILITIES

Suppliers qualifying for the production of AEG solar modules feature manufacturing facilities with highest automation levels reaching up to 95% and state-of-the-art manufacturing equipment with clear SOPs (Standard Operating Procedures) for each function and workstation, maintenance plans, criteria and records; and consistently trained personnel.

# AEG





## CAREFULLY SELECTED COMPONENTS

Solar Solutions works in close cooperation with suppliers to select high quality components that are tested and certified to guarantee a solid product able to withstand demanding environmental challenges.

We constantly strive to offer those technologies that have proven reliable in granting solar yields, and at the same time to optimize product design introducing new features to increase stability and efficiency -from PERC to multibusbar from half-cut cells to double glass.

While proven technical reliability is the core of the component selection, we ensure that these components grant each AEG module a perfect optical look. Choosing for instance glass, busbars and backsheets in ultra black to grant an elegant and seamless total look.

# AEG







# CERTIFIED PROCESSES

The manufacturing process of AEG solar modules unterlies exacting international standards which grant consistency in product quality and looks, and, ultimately, safety to the end customer.

AEG products are certified according to the standards of IEC 61215 and and IEC 61730-1/2 (2005 / 2016 recast).

Certifying against the IEC 61215 standard means ensuring the long-time reliability of the modules. Modules undergo accelerated stress tests- thermal, damp heat, humidity freeze cycles, as well as UV, static and dynamic mechanic load tests that are meant to evaluate the bounty of the module design against environmental stressors that could impair the module functioning in the field.

With the IEC 61730-1/2 certification, the focus lies on the safety requirements. The modules undergo exigent endurance tests against electrical shock hazard, fire hazard, and for mechanical and structural safety.

AEG solar modules are further tested according to local requirements of the specific markets and registered to the relevant national accreditation bodies.

Among the independent certification and accreditation bodies testing AEG solar modules are TÜV Süd, TÜV Rheinland, KIWA, CSI laboratories, etc.

The image shows a stack of three certification certificates. The top certificate is from CSI, issued on 24/01/2020, for Solar Solutions GmbH. The middle certificate is from kiwa, issued on 15/04/2022, for Solar Solutions GmbH. The bottom certificate is from TÜV Rheinland, issued on 15/04/2022, for Solar Solutions GmbH. Each certificate includes technical specifications and test results for PV modules.

**CSI Certificate:**  
 Certificate number: 15430 Rev.1  
 Issued: 24/01/2020  
 Replaces: 15430 Rev.0  
 First edition: 19/10/2016

**kiwa Certificate:**  
 Certificate number: 15430 Rev.1  
 Issued: 24/01/2020  
 Replaces: 15430 Rev.0  
 First edition: 19/10/2016

**TÜV Rheinland Certificate:**  
 Zertifikat No. PV 50463583  
 Blatt: 0002  
 Ihr Zeichen: M  
 Unser Zeichen: 01-279-50114900 017  
 Ausstellungsdatum: 15.04.2022  
 Date of Issue: (dd/mm/yyyy)

**Technical Specifications (from TÜV Rheinland certificate):**

Prüfzeichen	Zust. Mark	Geprüft nach	Tested acc. to
		AS-M4438-W-XXX-XXX-330-430, in steps of 5, 144 cells	IEC 61215-1-2:2016
		AS-M4438-W-XXX-XXX-330-430, in steps of 5, 120 cells	IEC 61215-1-3:2016
		AS-M4438-W-XXX-XXX-330-430, in steps of 5, 144 cells	IEC 61215-2:2016
		AS-M4438-W-XXX-XXX-330-430, in steps of 5, 120 cells	IEC 61730-1:2016
		AS-M4438-W-XXX-XXX-330-430, in steps of 5, 144 cells	IEC 61730-2:2016
		AS-M4438-W-XXX-XXX-330-430, in steps of 5, 120 cells	EN 61215-1:2016
		AS-M4438-W-XXX-XXX-330-430, in steps of 5, 144 cells	EN 61215-2:2016
		AS-M4438-W-XXX-XXX-330-430, in steps of 5, 120 cells	EN IEC 61730-1:2018
		AS-M4438-W-XXX-XXX-330-430, in steps of 5, 144 cells	EN IEC 61730-2:2018
		AS-M4438-W-XXX-XXX-330-430, in steps of 5, 120 cells	EN IEC 61730-2:2019

**Product Identification (from TÜV Rheinland certificate):**

Zertifiziertes Produkt (Certificate Identification): PV-Module  
 Certified Product (Product Identification): License Fee - Einmal

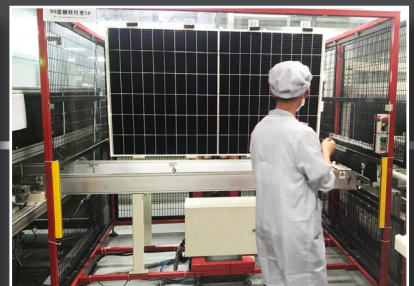
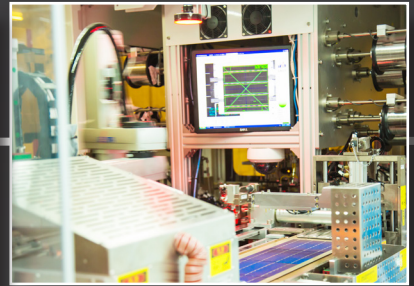
**Manufacturer Information (from TÜV Rheinland certificate):**

Hersteller: Solar Solutions GmbH  
 Brückenstraße 94,  
 60594 Frankfurt am Main  
 Germany

**Accreditation Bodies:** TÜV SÜD, TÜV RHEINLAND, KIWA, CSI

## 10 STEPS TO MODULE PRODUCTION

1. CELLS SOLDERING → 2. LAY-UP → 3. FIRST EL TEST AND VISUAL INSPECTION →  
4. LAMINATION → 5. FRAMING AND JUNCTION BOX MOUNTING → 6. CURING →  
7. CLEANING → 8. SAFETY TEST → 9. FLASH TEST → 10. SECOND EL TEST





# CONSTANT QUALITY MONITORING

An AEG solar module is „under the lens“ from its very inception with in-line and offline quality monitoring.

It starts with thorough visual inspection of cell quality and their 7-level classification; it continues with the use of layout machines for consistent allineation of cells and ribbons throughout the whole production; a first electroluminescence tests (EL) is taken after layup to examine the cell and interconnection consistency. The production is in full swing, yet technicians carefully carry out hourly basis checks of the soldering machine temperature and calibrate the equipment every two hours. Every aspect of the module is taken under the lens through visual inspections aided by high resolution cameras and mirrors; the module is then flashed to ensure that its outputs match the required specifications; and a further electroluminescence test is taken to ensure full product integrity.

Each and every step is regulated by a detailed list of Quality Assurance criteria which determine if the product qualifies as AEG solar module; compliance to these criteria is regularly verified by the Solar Solutions Quality Team.

After successfully passing this scrutiny, the AEG solar module is labelled with the AEG Quality Control Seal.



The AEG module is then carefully packed within a sturdy box, tightly wrapped with straps to ensure safe transportation on the pallets.

From here, through the hands of our selected and reliable partners of the AEG solar distribution network, the AEG solar modules reaches the rooftops of customer homes and project sites to start its mission of delivering clean energy for its lifespan of 30 years and beyond.

The file „AEG\_Cardboard example\_general.pdf“ consists of two pages. The first one represents the position

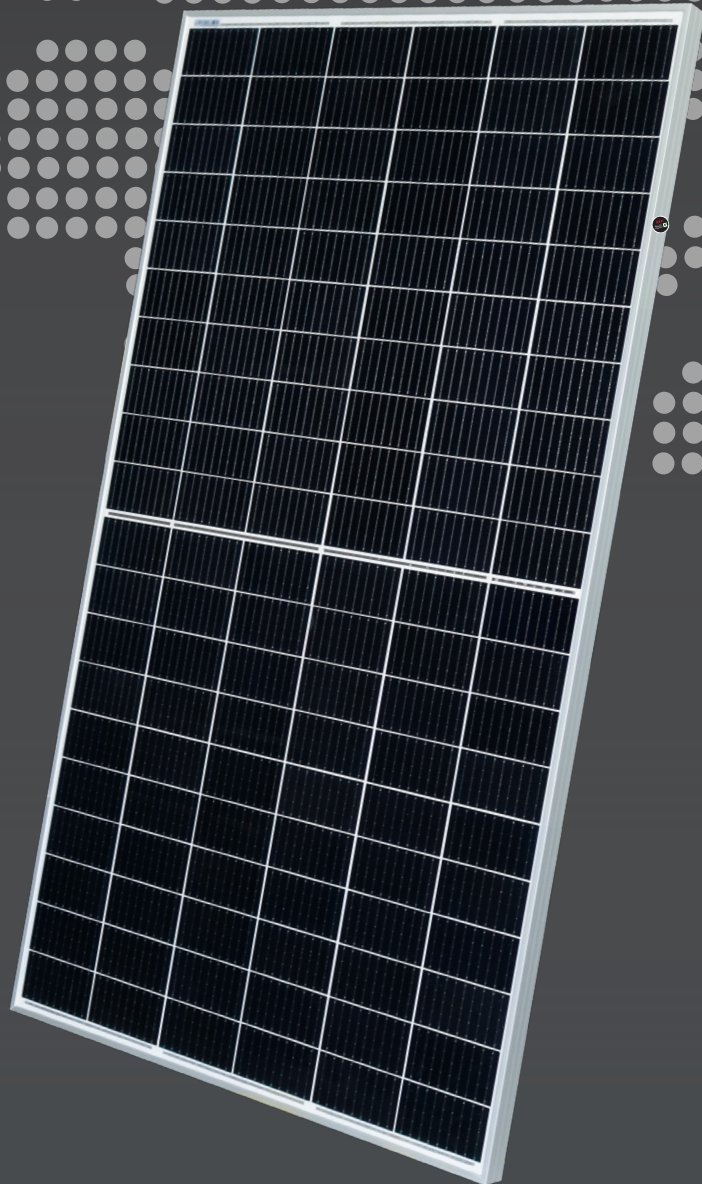
**Quality Management Processes Electroluminescence Inspection Criteria**  
Version: Dec 2019

**AEG** Solar Solutions GmbH · Brückenstrasse 94 · 65994 Frankfurt · Deutschland / Germany

**Quality Management Processes**  
**Visual Inspection Criteria 质量管理流程视觉检验标准**  
Version: March 2017

No.	Item 项目	Inspection Tool / Method 检测工具/方法	Value/Size of Inspection Criteria 检测标准/限值/尺寸
1	Cell colour 电池片颜色	Visual inspection 目视 Inspect module 2 meters away with the condition that UV-A is disconnected visual quality of inspection should be above 12. 目视检查模块(未开光源条件下)应高于12。	Contiguous colour of cells in a module is allowed. For example light blue and blue. The shade of nonadjacent colour in a module are not allowed. For example light blue and dark blue. 不允许同一组件中出现两种不相容的颜色。相邻浅蓝色和深蓝色。
2	Cell types 电池片类型/规格	Visual inspection 目视	No broken crystal and dirty crystal cells in the module. 不允许有碎裂或多脏晶片的电池片在组件中。
3	Cell breaks 电池片裂纹	Visual inspection 目视	No breaks allowed 不允许
4	Cell cracks 电池片裂纹	Visual inspection 目视	No cracks allowed 不允许
5	Cell edge damage 电池片边缘损伤	Visual inspection with steel ruler 目视	No cell chipping is allowed 不允许 V shape indentation at the cell edge is not allowed. If shape indentation with the following specification is allowed: Length > 2mm, Depth < 1mm, less than 2 damaged edges in 1 cell. Cell Gap filled between cells in the same string: ± 0.5 mm
6	Cell layout 电池片排列	Visual inspection with steel ruler 目视	Cell Gap filled between cell on edge: ± 1.5 mm Horizontal / Vertical cell dislocation: ± 1 mm Distance from both nearest edges of cells columns to the edge of glass is 4.5 mm. Distance from both nearest edges of cells columns to the edge of glass is no more than 5mm. 横向/纵向电池片的错位: ± 1 mm 从电池片边缘到玻璃边缘的距离: ± 4.5 mm 从电池片边缘到玻璃边缘的距离不大于 5mm
7	Bottom mark 电池片上标识	Visual inspection with steel ruler 目视	Length: 4.0 mm and depth: 0.5 mm

# AEG



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Germany

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