

*PowerMax*<sup>®</sup> SKALA



THE AVANT-GARDE OF SOLAR FAÇADES

ENGLISH

AVANCIS  CNBM



A photograph of modern glass skyscrapers at night. The buildings are illuminated from within, and their glass facades reflect the city lights. In the foreground, a large, illuminated, angular structure, likely a solar facade, is visible. The sky is a deep blue, and the overall scene is a vibrant urban nightscape.

*PowerMax*® SKALA

STATE-OF-THE-ART  
SOLAR FAÇADES



## FROM INSPIRATION TO DIVERSITY

PowerMax® SKALA is a thin-film PV module operating as a solar active building material to set totally new standards of aesthetic solar façade solutions – no matter what type of building or construction project.



# SKALA – THE ARCHITECTS' PANEL OF AVANCIS

The product platform PowerMax® SKALA is the solar façade materials group for office and commercial properties and infrastructure facilities. The engineering base is an aesthetic thin-film PV module developed for the building industry. SKALA is unique – in terms of design, energy efficiency, performance, quality and product safety.

Architects, façade planners and investors are given the possibility to realize individually designed solar façades with the highest aesthetics and highest energy output at the same time. SKALA is a multi-functional building material which generates solar energy.

## Design

The module design is pure aesthetics. The module is frameless without any apparent fixing and has a smooth homogeneous glass surface. The cell structure of the PV module is almost invisible.

## Quality

The quality and uniformity of the black colour is secured by a special production process with colour detectors.

## Efficiency

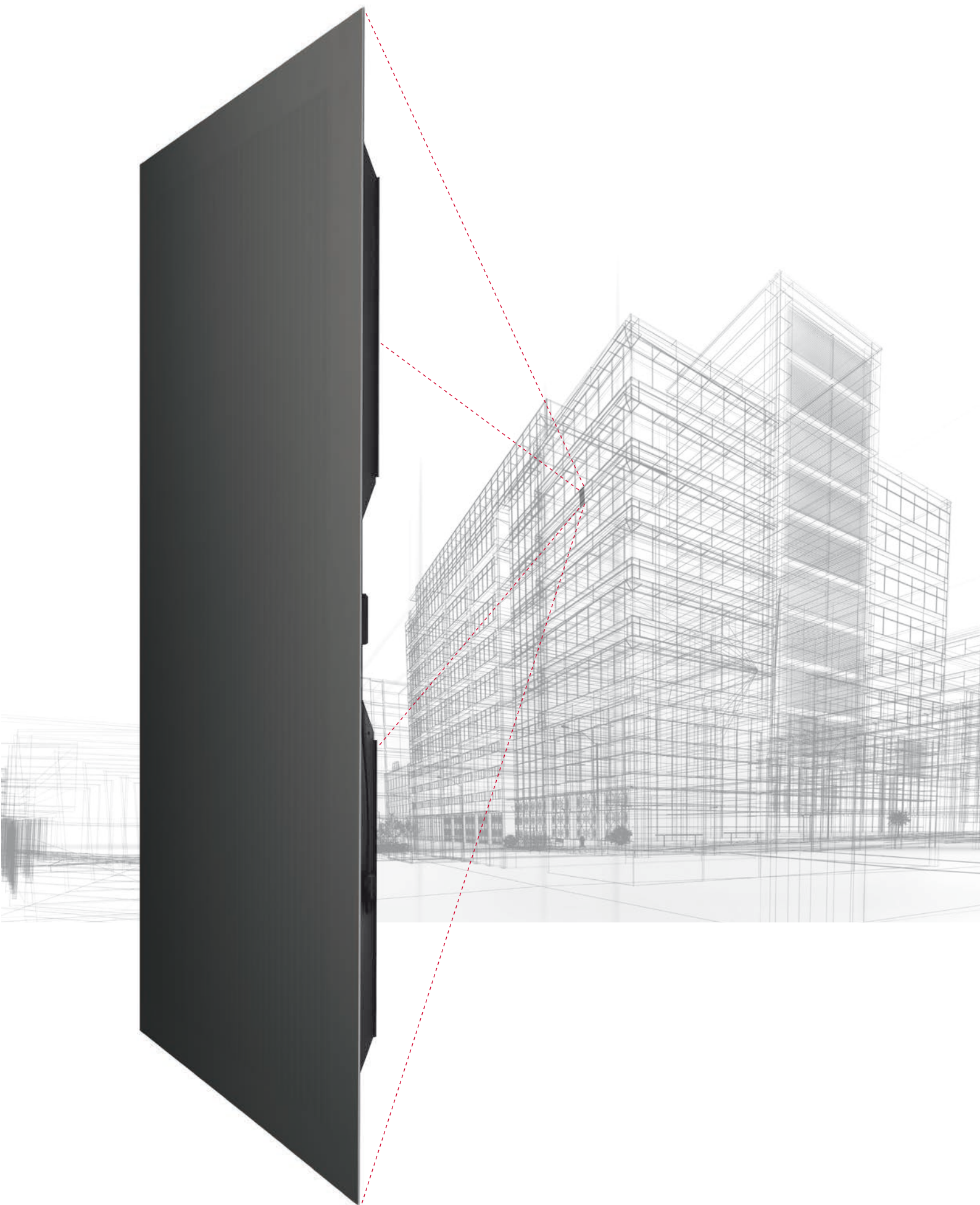
Thanks to SKALA, passive building envelopes are transformed into power generating façades which make an active contribution to the energy budget of the building.

## Performance

Thanks to its unsurpassed shading tolerance and spectral sensitivity, SKALA also produces solar energy under the most unfavorable weather and site conditions.

## Product safety

SKALA is engineered and made in Germany. Accredited according to ISO, IEC and abZ, it offers the highest quality and safety standards of the PV and building industry.





# TAILOR-MADE SOLUTIONS FOR BUILDING ENVELOPES ACCORDING TO:

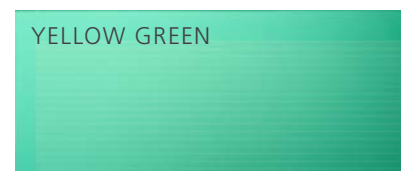
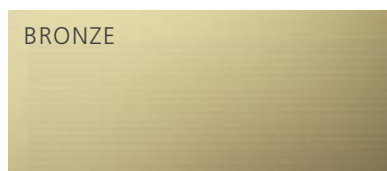
## MATERIAL

SKALA is a cross-material all-rounder. The architects' modules can be combined with a wide variety of façade materials such as aluminum, ALUCOBOND®, fiber concrete, wood, mesh metal etc. The dream of an aesthetic and at the same time economical solar façade becomes reality.

Standard Panel Colour



SKALA Colours

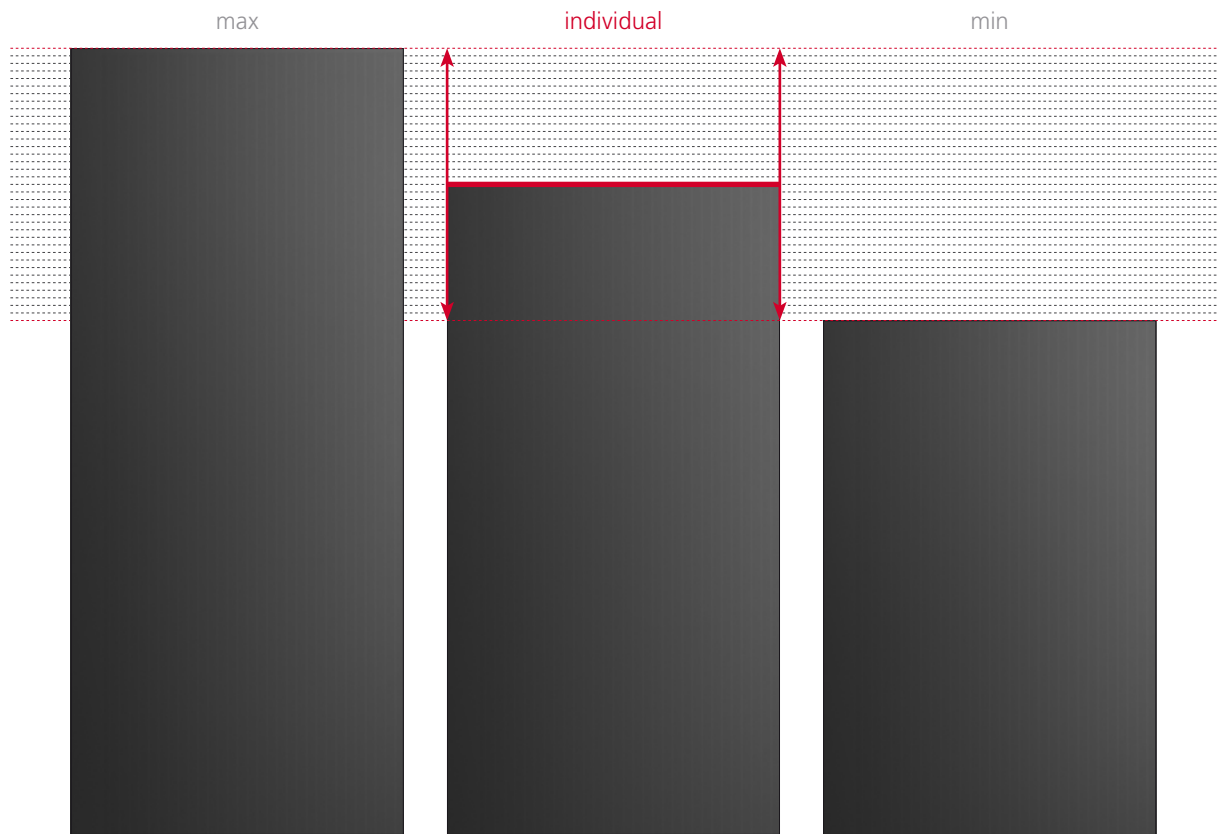


## COLOUR

Based on the special characteristics of the CIGS technology, SKALA modules stand out with a uniform black surface in a discreet pinstripe look.

A special adapted production process and strict quality guidelines in the optical range guarantee the stringent aesthetic requirements of the product.

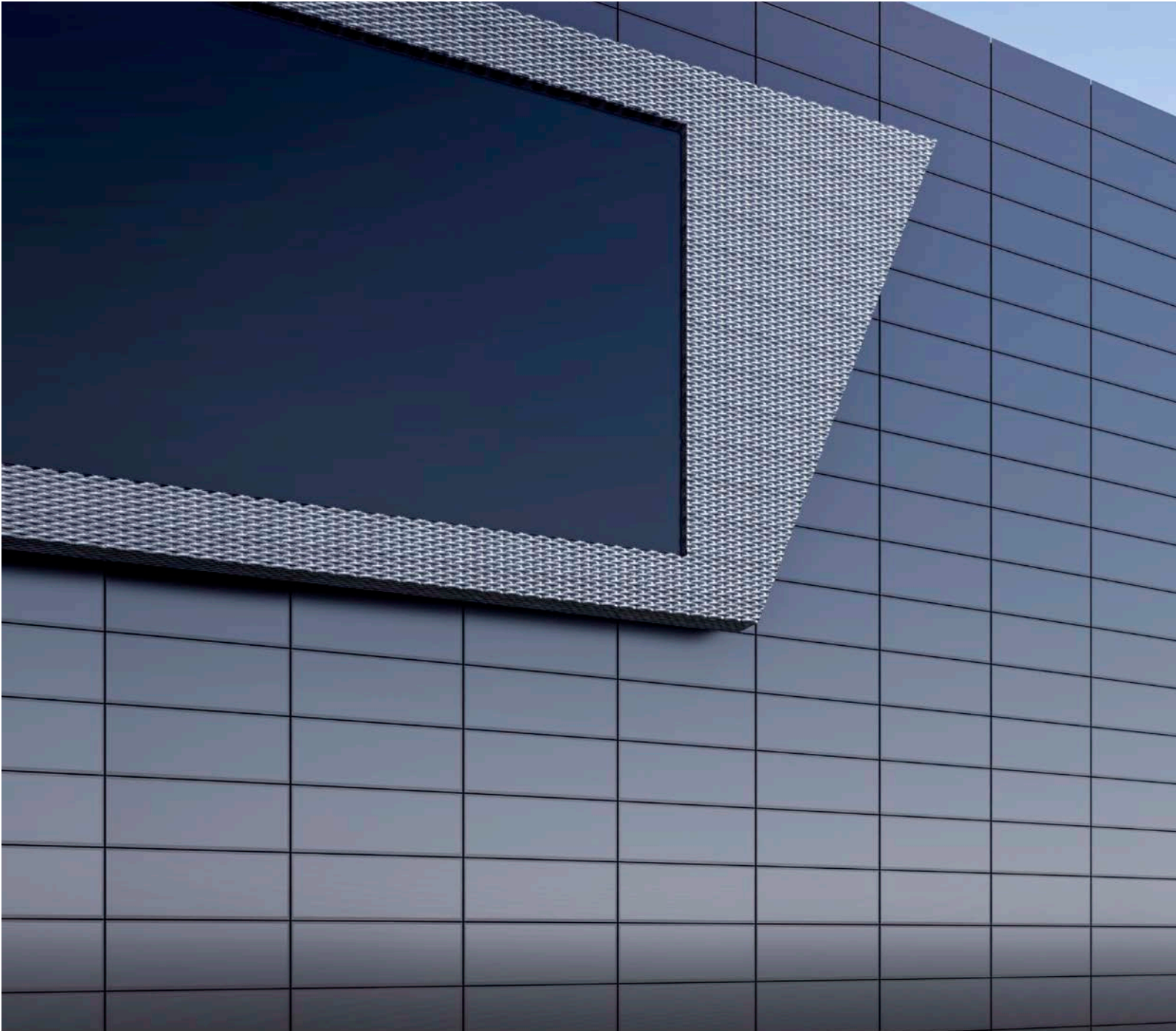
Using special front glasses, SKALA architecture modules can be produced in different colours. In contrast to other coloured PV modules, they use the reflection of the sunlight to create their colourfulness.



## SIZE

SKALA architects modules have a standard size of 1587 mm x 664 mm. Each module can be customized, so the combination of standardized and size-matched panels creates exclusive and customized solar façades. Builders, architects and façade planners are given an additional freedom to plan and design energetic constructions.





## OUR FULL-SERVICE CONCEPT: FROM PANEL TO A COMPLETE FAÇADE PROJECT

The planning and execution of solar façades require special structural engineering expertise. In addition, the design, technical and economic aspects from the customer, architect and construction manager need to be coordinated with the practical requirements of the façade builders and electricians.

All product and service strategies for the premium façade market are developed at the AVANCIS BIPV Design Center: from the product competence, to the technical consultancy up to the responsibility for planning, supervising and execution of the whole façade project via our network partners.





## OUR SERVICES AT A GLANCE

- **Delivery of façade modules:** production and delivery of your customized façade modules
- **Sales and technical consultancy** including calculation, partner coordination, production and delivery of complete façade-kits
- **Solar façade project including project management, design and concept of the complete solar façade solution with AVANCIS partner network:** AVANCIS customers benefit from a focal point for coordination and management of the project partners up to the installation and acceptance of the façade (turn-key).

# VENTILATED FAÇADE SYSTEMS WITH SKALA

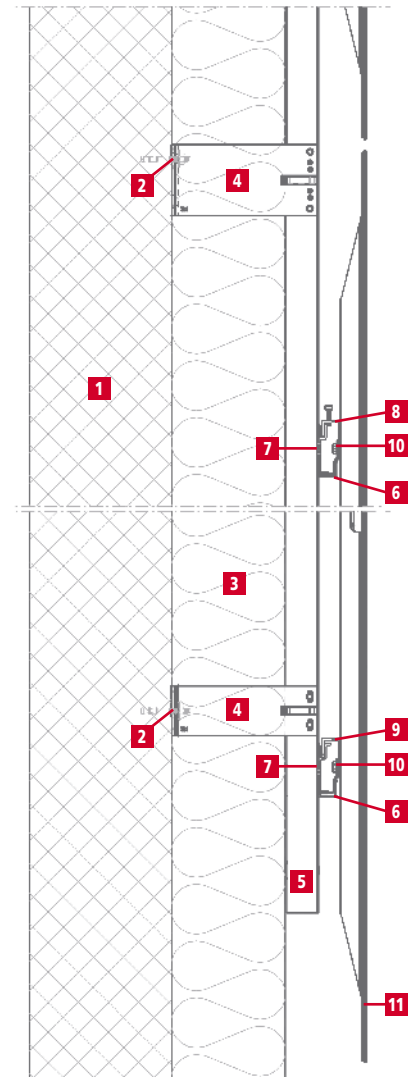
SKALA architecture modules were designed for the innovative and functional use in ventilated façade systems as part of an energy efficient and sustainable building envelope.

To ensure the maximum performance, generally the PV modules need sufficient ventilation for the cooling and dissipation of condensation and moisture.

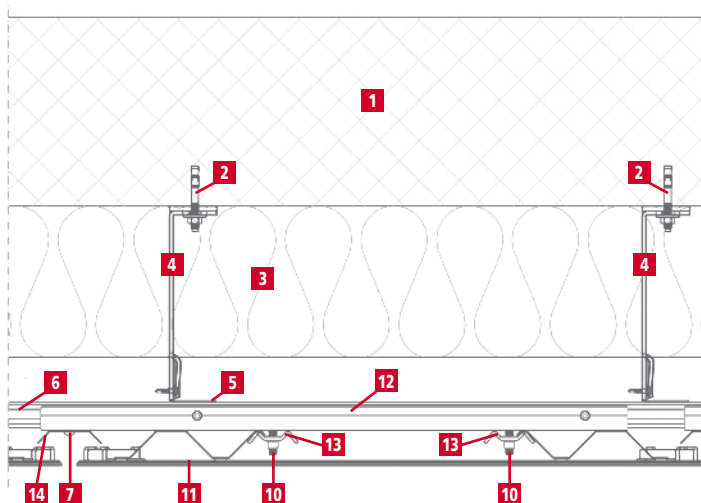
Ventilated façades combine the advantages of an aesthetic solution with a thermal and water repellent protective cover for the building. With SKALA, the passive façade becomes a solar-active façade which generates green energy for the building. Solar façades with SKALA are not only eco-friendly; they proactively contribute an improvement to the building's energy balance finally reducing the total cost of ownership of the building.

Whether as prefabricated façade kit or turnkey façade solution: SKALA is your customized module for your individual energy efficient construction project.

Vertical Cut



Horizontal Cut



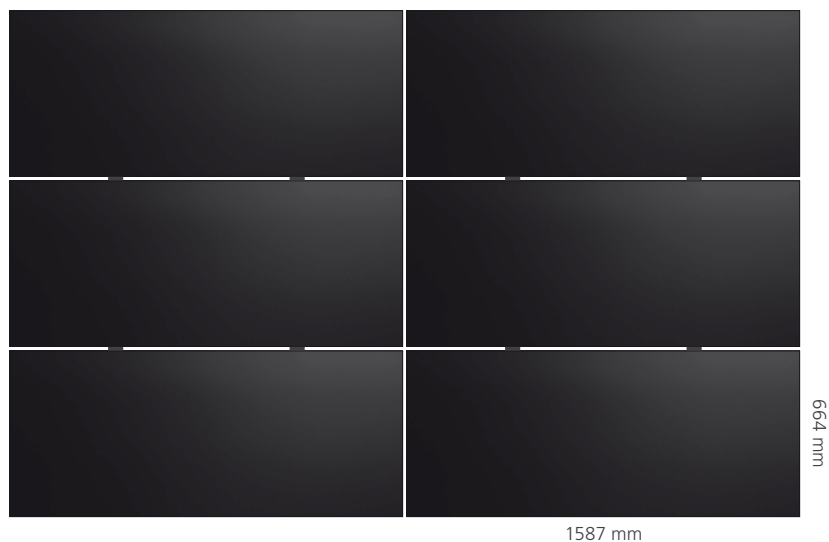
- 1 structure
- 2 anchoring
- 3 insulation
- 4 vertical console system
- 5 vertical support profile
- 6 horizontal profile
- 7 fasteners
- 8 agraffes adjustable
- 9 agraffe rigid
- 10 screw with washer
- 11 Avancis SKALA module
- 12 agraffe
- 13 W-bracket with blind rivet nut
- 14 Avancis joint plate



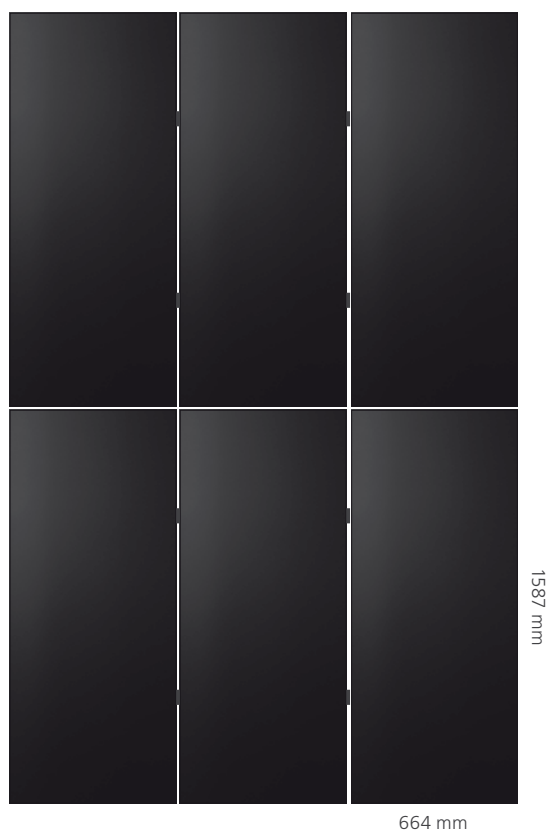
## MOUNTING: EASY, FAST AND FLEXIBLE

Depending on the regional and local building regulations, SKALA architects' modules can be installed both in portrait and landscape format.

Landscape Mounting



Portrait Mounting



Module back with Backrail System



Thanks to its back-rails and agraffe system fixed on the backside of the module, SKALA can be mounted easily, fast and flexible on each façade sub-construction.



# SPECIFICATIONS FOR STANDARD SIZE IN BLACK

## PowerMax® SKALA

- Is a glass-glass module without disturbing frame.
- Has an opaque black colour as standard version.
- Does not need mechanical clamping on the front glass due to its back-rail system fitting to all common façade substructures.
- Is most suitable for curtain wall / ventilated façades.
- Can be combined with a variety of other façade materials.
- Can be installed in portrait and landscape format. (depends on regional building regulations)
- Is available in different colours and sizes.
- Has the general building approval (abZ) from Deutsches Institut für Bautechnik (DIBt), certified as a non-regulated building component.
- Is developed and produced in Germany – approved according to all relevant certifications and guarantees.

## ELECTRICAL SPECIFICATIONS

Data measured under standard test conditions (STC):

PowerMax® SKALA	145
Nominal power $P_{nom}^*$	145 W
Sorting	-0/+5 W
Module efficiency $\eta$	13.8 %
Aperture efficiency $\eta$	15.2 %
Open-circuit voltage $V_{oc}^*$	80.1 V
Short-circuit current $I_{sc}^*$	2.59 A
Voltage at mpp $V_{mpp}^*$	61.9 V
Current at mpp $I_{mpp}^*$	2.34 A
Max. over-current protection $I_R$	4.0 A
Max. system voltage $V_{sys}$ (IEC)	1000 V

Insolation intensity 1000 W/m<sup>2</sup> in the plane of the module, module temperature 25 °C and a spectral distribution of the sunlight according to the atmospheric mass (AM) 1.5.

\* Manufacturing tolerance: -5 %/+10 %

Data measured at nominal module temperature (NMOT)\*\* and AM 1.5:

PowerMax® SKALA	145
NMOT	40 °C
Nominal power $P_{nom}$	109 W
Open-circuit voltage $V_{oc}$	76 V
Short-circuit current $I_{sc}$	2.07 A
Voltage at mpp $V_{mpp}$	58 V

\*\* NMOT: Module operating temperature at 800 W/m<sup>2</sup> insolation intensity in the plane of the module, air temperature 20 °C, wind speed 1 m/s and open-circuit condition.

## MECHANICAL SPECIFICATIONS

PowerMax® SKALA	Value
External dimensions	1,587 x 664 mm <sup>2</sup>
Thickness	38 mm
Weight	17 kg
Cell type	CIGS
Frame	none
Front cover	3.2 mm tempered glass
Anti reflective coating	yes
Junction box protection class	IP67
Dimensions of the junction boxes	60 x 60 x 11.5 mm <sup>3</sup>
Cable lengths (⊖ plug   ⊕ socket)	200   320 mm
Cable cross section	2.5 mm <sup>2</sup>
Connector type	TPCB-4

Temperature coefficients:

PowerMax® SKALA	Value
Temperature coefficient $P_{nom}$	-0.39 %/°C
Temperature coefficient $V_{oc}$	-230 mV/°C
Temperature coefficient $I_{sc}$	0 mA/°C

Data measured at low light intensity:

The relative reduction in the module efficiency at a light intensity of 200 W/m<sup>2</sup> relative to 1000 W/m<sup>2</sup> at 25 °C module temperature and spectrum AM 1.5 is 6 %. At 500 W/m<sup>2</sup> the relative improvement in module efficiency is +1 %.

As a result of ongoing research and product improvements, the specifications in this product data sheet are subject to changes without prior publication. This data sheet is not allowed to be used for deriving any rights, and AVANCIS does not accept any liability with regard to and resulting from the use of information contained herein. Installation equipment is not supplied with the product.



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Safety Class II



- Design qualification and type approval, IEC 61646
- Safety qualification, IEC 61730

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