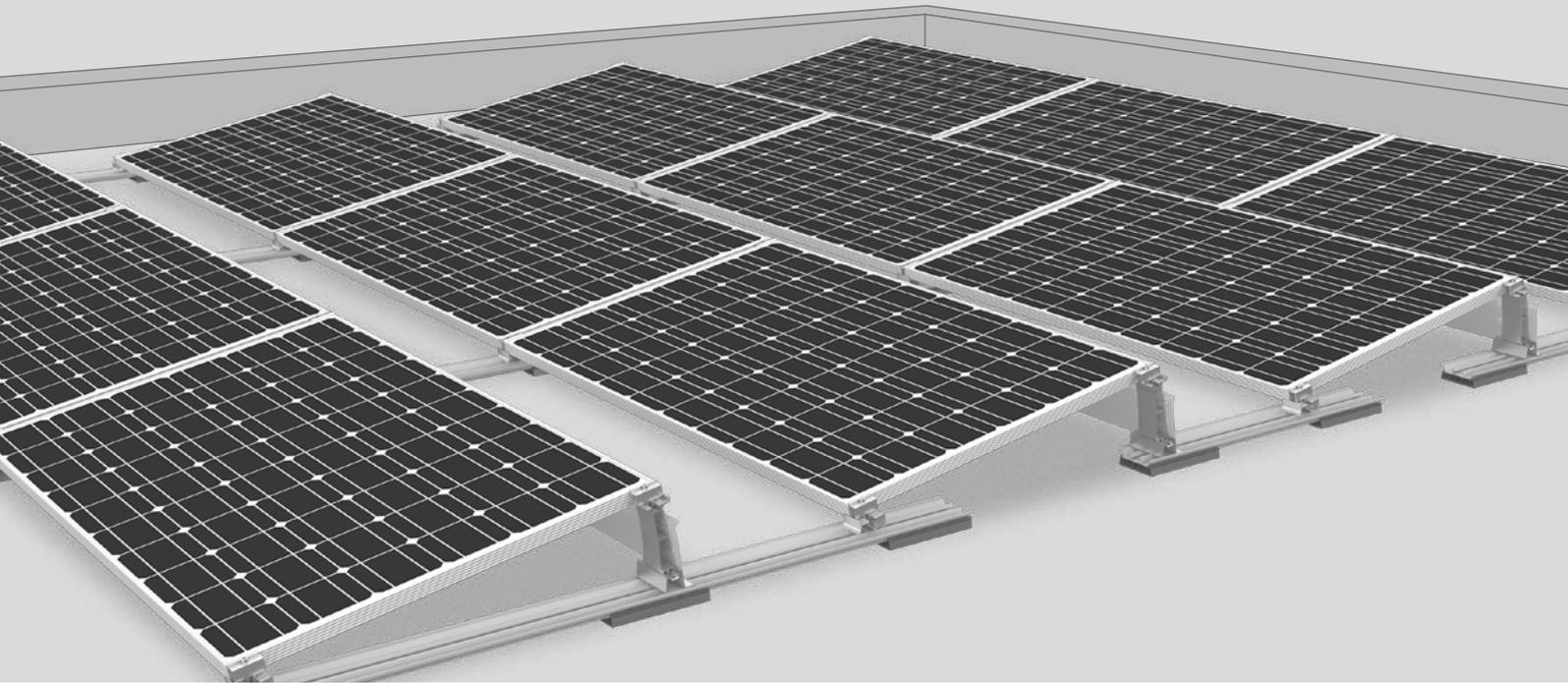




S-Dome V 10° System

The single-sided elevation



- ▶ Clearly ballast- and component-optimized system due to better friction coefficient of the flexible support pad
- ▶ Simultaneous assembly of modules and mounting system as well as reduced screw connections ensure faster installation
- ▶ Lower logistics costs due to lower transport volume



Components



Mat V

- ▶ Flexible Mat V made of EPDM – only 1 size and 1 variant (no aluminium lamination required)
- ▶ Absorbs and compensates for tolerances
- ▶ Friction coefficients reduce ballast



Rail mounting rail

- ▶ Integrated ballast support almost eliminates the need for additional components
- ▶ Short rails to accommodate the tolerances



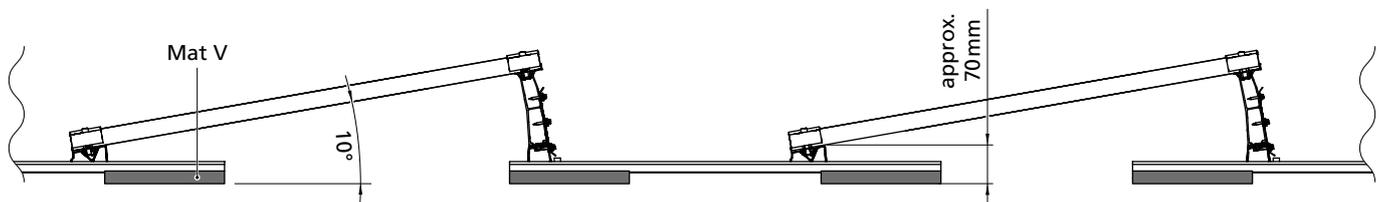
Dome V elevation

- ▶ Changed geometry and connections to accommodate tolerances
- ▶ Single screw connection and fast screw-in assembly of the SD with fixation via module clamp
- ▶ Low transport volume



Universal module clamps: MiniClamp MC/EC

- ▶ Clamping range 30 - 50 mm
- ▶ Compatible with MiniRail and all Dome V Systems
- ▶ Optional: Equipotential bonding with TerraGrif possible



Technical data

	S-Dome V 10°
Scope of application	Flat roofs $\leq 5^\circ$ with single ply membrane or bituminous roof covering, also on concrete, gravelled or green roofs
Fastening type/roof fixture	Ballasted; no roof penetration for inclination $\leq 3^\circ$
Requirements	<ul style="list-style-type: none"> ▶ Permissible module dimensions (L x W x H): 1550-1760/1880-2100 x 950-1053 x 30-50 mm ▶ Minimum system size: 2 modules ▶ Clamping in corner areas permitted (see k2-systems.com/en/approved-modules)
Technical specifications	<ul style="list-style-type: none"> ▶ Thermal separation after a maximum of 15.5 m ▶ Minimum distance to the edge of the roof 600 mm
Inclination angle	10°
Material	<ul style="list-style-type: none"> ▶ Mounting rails, Peak, Basic, SD and MiniClamps: Aluminium EN AW-6063 T66 and AW-6082 T6 ▶ Windbreaker: Magnelis ▶ Mat V protective mat: EPDM ▶ Small parts: stainless steel (1.4301) A2-70

Certification of structural analysis for the D-Dome V 10° System

This certifies the structural examination of the D-Dome V 10° mounting system.

The design checks in the ultimate limit state of the above mentioned systems as well as the checks of position stability against lifting and sliding are fulfilled for the reference conditions listed below and on the basis of validation checks.

The reference conditions are:

- ▶ Angle of inclination: 5° roof inclination, 15° elevation
- ▶ Wind load: $q_p = 0,85 \text{ kN/m}^2$
- ▶ Snow load: $s_k = 0,85 \text{ kN/m}^2$

The calculations were performed in accordance with the following applicable standards:
DIN EN 1991-1-4 and -3 and DIN EN 1993 and DIN EN 1999-1-1.

This certification does not serve as a project specific structural analysis report. The structural design for each individual project needs to be carried out considering the local constraints with the dimensioning software Base. The required ballast for the check of position stability will be determined in K2 Base calculation basis.

Renningen, July 2020



Ronald Laude
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Dipl. civil engineer

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www.k2-systems.com



Client: K2 Systems GmbH, Renningen, Germany

Project No.: KSR03

Report No.: KSR03-4-2

Wind loads on the „S-Dome V 10” rooftop mounting system for PV plants of K2 Systems GmbH

Design wind loads for uplift and sliding according to EN 1991-1-4

The present report consists of 2 pages.

Aachen, November 19, 2019, extended on November 25

Dr.-Ing. Thorsten Kray

Management:
Dipl.-Ing. B. Konrath, Dr.-Ing. R.-D. Lieb
Scientific Advisory Board:
Prof. Dr.-Ing. R. Grundmann, Prof. Dr.-Ing. H. Funke,
Prof. Dr.-Ing. Th. Heynen
Established by:
Prof. Dr.-Ing. H.J. Gerhardt, Prof. Dr.-Ing. C. Kramer

Sparkasse Aachen
IBAN: DE26 3905 0000 0047 4400 03
BIC: AACSD33
Local Court of Aachen
HRB 4518
VAT ID No.: DE121682741
Tax No.: 201/5968/3374

Accredited Test and Certification Body
European Notified Product Certification Body 1368
in accordance with the CPR
LADBS approved laboratory for wind tunnel testing of
buildings and structures, Testing Agency License
Number TA 24830

Wind tunnel data was analyzed to determine the design wind loads on the „S-Dome V 10“ ballasted rooftop mounting system for PV plants of K2 Systems GmbH. The analysis was performed by I.F.I. Institut für Industrieaerodynamik GmbH (Institute for Industrial Aerodynamics), Institute at the Aachen University of Applied Sciences in accordance with the test procedures described in the German Standards DIN EN 1991-1-4:2010-12 and DIN EN 1991-1-4/NA:2010-12 and with the wind tunnel guideline of the German Wind Engineering Association, WTG.

The array assembly of the „S-Dome V 10“ ballasted rooftop mounting system for PV plants is depicted in Figure 1.

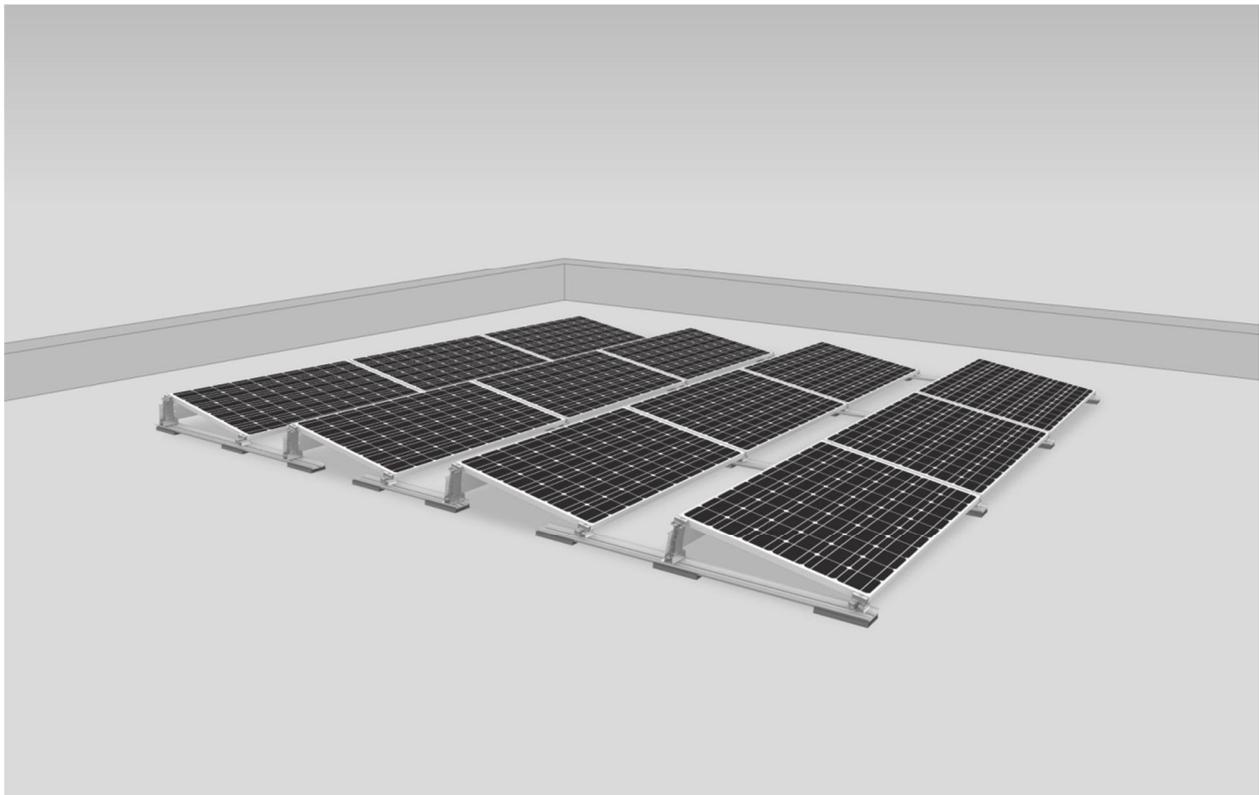


Figure 1: Array assembly of the “S-Dome V 10” ballasted rooftop mounting system for PV plants with module tilt angles of 10°

Force and pressure coefficients were provided for effective wind areas of varying size, three roof zones and six array zones and are valid for roofs having a slope (α) of $-5^\circ < \alpha < +5^\circ$ with heights up to 20m. Structural calculations and ballast design may be performed based on these aerodynamic coefficients and on the peak velocity pressure, q_p , determined depending on the wind zone, the terrain category and the roof height in accordance with EN 1991-1-4 and the National Annexes to EN 1991-1-4. Design wind loads may also be calculated taking into account national wind loading standards.

Detailed design specifications are given in reports KSR03-2, KSR01-9, KSR02-2, KSR02-3, KSR02-6 and KSR02-7.

1. Warranty

1.1. We provide a warranty for end customers under the requirements of these warranty terms and conditions that the products sold under our brand name "K2" will be free of defects in material and workmanship for a period of twelve (12) years from the date of commissioning.

1.2. This warranty applies to our products delivered between 01-11-2019 and the day on which the new warranty terms and conditions come into force. The existing rules apply for our products delivered before 01.11.2019.

1.3. This warranty is intended solely for end customers. It does not apply to distributors, installation companies or second-hand owners. End customers are the purchasers of our products, who have purchased them for their own requirements and not for the purpose of resale or who have purchased a solar system (possibly in combination with a building) with our products installed in it. Our warranty does not apply to products that have been removed and reinstalled, except for repair purposes, or used for any other purpose.

1.4. This warranty is an independent, voluntary and free benefit provided for end customers, which has no influence on possible quality agreements between the end customer and the seller of our products (if this is not us).

1.5. Claims under this warranty may not be transferred to third parties.

1.6. This product warranty applies within the European Union or within the third country in which our product was first put on the market by us. Warranty claims can only be asserted within the twelve-year warranty period. An extension of the warranty period is excluded, regardless of the legal grounds.

1.7. This warranty is only extended to the seller of our products irrespective of statutory warranty claims. Such claims are neither limited nor justified against us, in so far as no direct purchase contract exists with us.

2. Warranty services

2.1. In the case of a warranty claim, we will at our own discretion either repair the product free of charge, supply a free replacement or reimburse you at the product's current market value. An equivalent of the original component is also deemed to be a replacement.

2.2. A repair and replacement delivery or a reimbursement at the current market value are the sole and exclusive services provided under this warranty. Other services are not provided under this warranty. In particular, we accept no costs for the removal of a defective component, the return transport to us or the authorised seller as well as delivery and reinstallation on the basis of this warranty.

3. Exclusions and limitations

3.1. Claims under this warranty may not be asserted for a defect on one of our products

- ▶ due to forces of nature, force majeure and other unforeseeable circumstances outside our direct control, such as earthquakes, typhoons, hurricanes, volcanic eruptions, floods, lightning, snow damage or nuclear incidents
- ▶ due to improper maintenance, in particular a repair or modification made by third parties not expressly authorised by us
- ▶ in the case of a purely visual defect or normal wear and tear through use
- ▶ as a result of failure to observe the applicable rules based on the latest technology, the applicable standards and building regulations and information from the static calculation for the mounting system or guidelines in the assembly instructions

3.2. The assertion of this warranty also presupposes that our products are used properly for their intended purposes and they do not show signs of wear and tear or external damage that exceed the amount expected for normal use. Furthermore, it is essential to observe our assembly instructions. It is a mandatory prerequisite for the assertion of this warranty to comply with the safety instructions and warnings contained therein and observe the assembly and operating instructions.

3.3. Excluded from the warranty are rubber components or plastic components that have no function and parts that are exclusively a mounting aid and have no effect on the function of the products.

3.4. Our total liability under this warranty is limited to the purchase price of the defective product. We accept no liability in particular on the basis of this warranty for incidental damages, loss of profits, consequential damages or indirect damages, any failure of electrical capacity and/or compensation from an energy supply company. Statutory warranty claims or tortious claims against us as well as claims under the Product Liability Act remain unaffected.

4. Warrantor, assertion of the warranty, complaint periods

4.1. The warrantor is
K 2 Systems GmbH,
Industriestr. 18, 71272 Renningen, Germany
(<https://www.k2-systems.com>).

4.2. Claims under or in connection with this warranty must be asserted within the twelve-year warranty period at the latest six weeks after the occurrence of the event triggering the claims and notified to us in text form (e.g. by letter or E-mail) (if necessary, through the customer's contractual partner as a provider/messenger). Late complaints are not taken into account. The decisive factor for compliance with the warranty period is the timely receipt of the notification by us or by the customer's contractual partner, provided that they pass the complaint on to us immediately.

4.3. The customer is only entitled to return products under complaint with our prior written consent.

4.4. The assertion of warranty claims must be accompanied by the following documents and information: contact details of the end customer, date of commissioning, K2 Base project report (if available), sufficiently detailed photos (overall view of the system and detailed picture of the defect) as well as the original quotation for the installation of the system or the order confirmation related to this.

4.6. This warranty and legal disputes related to this warranty are governed by the law of Federal Republic of Germany with the exclusion of the UN Convention on Contracts for the International Sale of Goods (CISG).

Version 6 (dated: 01-11-2019)

Certificate of conformity of the factory production control

0769 – CPR – VAS – 00359 – 2

In compliance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR), this certificate applies to the construction product

Steel and aluminium structural components

Technical delivery specification	Execution	Method of declaration according to EN 1090-1
EN 1090-2 EN 1090-3	EXC 1 to EXC 3 Material according to EN 10025-2, stainless steel according to Z-30.3-6, EN 15088 Without welding fabrication	ZA 3.3 ZA 3.4

placed on the market under the name or trade mark of

K2 Systems GmbH

Industriestraße 18, 71272 Renningen, Germany

and produced in the manufacturing plant

K2 Systems GmbH

Industriestraße 18, 71272 Renningen, Germany

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in Annex ZA of the standard

EN 1090-1:2009 + A1:2011

under system 2+ are applied and that

the factory production is assessed to be in conformity with the applicable requirements.

This certificate was first issued on 8. May 2014 and will remain valid until 8. August 2021 as long as neither the harmonized standard, the construction product, the AVCP methods nor the manufacturing conditions in the plant are modified significantly, unless suspended or withdrawn by the notified factory production control certification body.

Karlsruhe, 9. August 2016



Head of the certification body

Univ.-Prof. Dr.-Ing. T. Ummenhofer

Declaration of Performance

0769

System components composed of aluminium, steel and stainless steel for ground-mounted and roof-top photovoltaic module substructures.

The system components can either be used directly, or be installed in partially existing systems. The components are manufactured from hot-rolled or cold-formed construction materials made of steel, aluminium and stainless steel, or extruded aluminium profiles. The profile cross-sections of the construction material can take various forms. Steel components are hot-dip galvanized. Aluminium and stainless steel are mill-finished.

K2 Systems GmbH
Industriestraße 18
71272 Renningen

Mounting systems for solar technology



System 2+

Based on the production control certificate for aluminum and steel Cert. No.: 0769-CPR-00359-1, the manufacturer/distributor confirms the following performance features relating to component specifications:

Performance Features	Declared Performance	Harmonised Standard Technical Specification
Standard geometric tolerances	EN 1090-2 EN 1090-3	EN1090-1: 2009 + A1: 2011
Weldability	EN AW-6063 T66 in accordance with EN 1999-1-1 and S235/S275/S355 in accordance with EN 10025-2	EN1090-1: 2009 + A1: 2011
Fracture toughness	Steel: Inspection certificate 3.1 in accordance with EN 10204 in compliance with EN 1993-10 Not required for aluminium	EN1090-1: 2009 + A1: 2011
Fire behaviour	Class A1	EN1090-1: 2009 + A1: 2011
Durability	EN AW-6063 T66 in accordance with EN 1999-1-1 Steel: specifications provided by coater and galvaniser	EN1090-1: 2009 + A1: 2011
Release of cadmium	No performance determined	EN1090-1: 2009 + A1: 2011
Release of radioactive radiation	No performance determined	EN1090-1: 2009 + A1: 2011
Load capacity	No performance determined	EN1090-1: 2009 + A1: 2011
Deformation at serviceability limit state	No performance determined	EN1090-1: 2009 + A1: 2011
Fire resistance	No performance determined	EN1090-1: 2009 + A1: 2011

The system components of the mounting substructure correspond to the declared performance specified in the above table and pursuant to the delivery note. This declaration of performance is issued under the sole responsibility of the manufacturer/distributor.

Signed on behalf of K2 Systems GmbH, Katharina David (Managing Director)

Renningen, 23.04.2015

Certificate

Standard **ISO 9001:2015**

Certificate Registr. No. **01 100 101608**

Certificate Holder:



K2 Systems GmbH

Industriestr. 18
71272 Renningen
Germany

Scope:

Development, production and distribution of innovative and customer-specific mounting systems for solar technology, including customer-oriented design calculations and services

Proof has been furnished by means of an audit that the requirements of ISO 9001:2015 are met.

Validity:

The certificate is valid from 2020-03-09 until 2023-02-27.

First certification 2017

Date of recertification audit: 2020-02-28

Expiry date of last certification cycle: 2020-02-27

2020-03-09

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln