

Deutsche Akkreditierungsstelle GmbH

Anlage zur Akkreditierungsurkunde D-PL-11120-01-00 nach DIN EN ISO/IEC 17025:2018

Gültig ab: 13.12.2019

Ausstellungsdatum: 13.12.2019

Urkundeninhaber:

**TÜV Rheinland Energy GmbH
Solar Energy Assessment Center (SEACC)
Am Grauen Stein, 51105 Köln**

Prüfungen in den Bereichen:

**Regenerative Energien, photovoltaische und solarthermische Systeme und
Komponenten, einschließlich der Vor-Ort-Prüfung und Außentestflächen von Anlagen sowie
Umweltsimulation**

**Innerhalb der mit * gekennzeichneten Akkreditierungsbereiche ist dem Prüflaboratorium, ohne
dass es einer vorherigen Information und Zustimmung der DAkKS bedarf, die Anwendung der hier
aufgeführten genormten Prüfverfahren mit unterschiedlichen Ausgabeständen der Normen
gestattet.**

**Das Prüflaboratorium verfügt über eine aktuelle Liste aller Prüfverfahren im flexiblen
Akkreditierungsbereich.**

verwendete Abkürzungen: siehe letzte Seite

Photovoltaik (PV)

IEC 60891* 2009-12	Photovoltaic devices - Procedures for temperature and irradiance corrections to measured I-V characteristics
IEC 60904-1* 2006-09	Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics
IEC 60904-1-1* 2017-05	Photovoltaic devices - Part 1-1: Measurement of current-voltage characteristics of multi-junction photovoltaic (PV) devices
IEC 60904-2* 2015-01	Photovoltaic devices - Part 2: Requirements for reference solar devices
IEC 60904-3* 2016-04	Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data
IEC 60904-4* 2009-06	Photovoltaic devices - Part 4: Reference solar devices - Procedures for establishing calibration traceability
IEC 60904-5* 2011-02	Photovoltaic devices - Part 5: Determination of the equivalent cell temperature (ECT) of photovoltaic (PV) devices by the open-circuit voltage method
IEC 60904-7* 2008-11	Photovoltaic devices - Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices
IEC 60904-8* 2014-05	Photovoltaic devices - Part 8: Measurement of spectral response of a photovoltaic (PV) device
IEC 60904-8-1* 2017-05	Photovoltaic devices - Part 8-1: Measurement of spectral responsivity of multi-junction photovoltaic (PV) devices
IEC 60904-9* 2007-10	Photovoltaic devices - Part 9: Solar simulator performance requirements
IEC 60904-10* 2009-12	Photovoltaic devices - Part 10: Methods of linearity measurement
IEC TS 60904-12* 2017 CDM Ed 1 2016-04	Photovoltaic devices - Part 12: Infrared thermography of photovoltaic modules

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IEC TS 60904-13:2017 PRVDTS Ed 1* 2017-06	Photovoltaic devices - Part 13: Electroluminescence of photovoltaic module
IEC 61215 2005-04	Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval
IEC 61215-1* 2016-03	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1: Test requirements
IEC 61215-1-1* 2016-03	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules
IEC 61215-1-2* 2017-12	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-2: Special requirements for testing of cadmium telluride (CdTe) photovoltaic (PV) modules
EN 61215-1-3* 2017-12	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-3: Special requirements for testing of amorphous silicon (a-Si) and microcrystalline silicon (c-Si) photovoltaic (PV) modules
EN 61215-1-4* 2017-12	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-4: Special requirements for testing of copper indium gallium selenide (CIGS) and copper indium selenide (CIS) photovoltaic (PV) modules
EN 61215-2* 2016-03	Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures
IEC 61646* 2008-05	Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval
IEC 61730-1* 2016-08	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
EN IEC 61730-1* 2018-04	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
EN 61730-1* 2004-10 +A1:2012 +A2:2013 +A11:2014	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction

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UL 61730-1 2017-12	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
IEC 61730-2* 2004-10 +AMD1:2011	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
IEC 61730-2* 2016-08 FDIS	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
EN IEC 61730-2* 2018-04	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
UL 61730-2 2017-12	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
IEC 61683* 1999-11	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
IEC 61727* 1995-06	Photovoltaic (PV) systems - Characteristics of the utility interface
IEC 62093* 2005-03	Balance-of-system components for photovoltaic systems - Design qualification natural environments
IEC 62108* 2016-09	Concentrator photovoltaic (CPV) modules and assemblies - Design qualification and type approval
IEC 62124* 2004-10	Photovoltaic (PV) stand-alone systems - Design verification
IEC 62759-1* 2015-06	Photovoltaic (PV) modules - Transportation testing - Part 1: Transportation and shipping of module package units
IEC TS 62915 2017 CDTS ED1 2017-08	Photovoltaic (PV) modules – Retesting for type approval, design and safety qualification
UL 1699B* 2013-01	Photovoltaic (PV) DC Arc-Fault Circuit Protection
ANSI/UL 1703* 2014-11 Third Edition 05.20	Flat-plate photovoltaic modules and panels

IEC 61701* 2011-12	Salt mist corrosion testing of photovoltaic (PV) modules
IEC 62716* 2013-06 Corrigendum 1 2014-05	Photovoltaic (PV) modules - Ammonia corrosion testing
2 PfG 1911/03.11 2011-03	Specification for requirements for resistance of Photovoltaic Components against ammonia atmosphere
IEC 62446-1* 2016-01	Photovoltaic (PV) systems - Requirements for testing, documentation and maintenance - Part 1: Grid connected systems - Documentation, commissioning tests and inspection
EN 13583* 2012-07	Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of hail resistance
EN 14437* 2004-11	Determination of the uplift resistance of installed clay or concrete tiles for roofing - Roof system test method
EN 50380* 2003-03	Datasheet and nameplate information for photovoltaic modules
ASTM E2236* 2010-06	Standard Test Methods for Measurement of Electrical Performance and Spectral Response of Nonconcentrator Multijunction Photovoltaic Cells and Modules
QMA 2.583.10 Ed. 3 2017-01	Energy Yield Assessment for PV systems (Erstellung von PV-Ertragsgutachten)
2 PfG 1795/10.15 2015-10	„Power Controlled“ for Photovoltaic (PV) modules
2 PfG 1794/10.10 2010-10	Qualification of PV mounting systems
2 PfG 2376/02.14 2014-02	Shipping units of Photovoltaic (PV) modules - Design qualification and type approval
2 PfG 2387/11.14 2014-11	System voltage durability qualification test for crystalline silicon modules (Potential Induced Degradation (PID))
2 PfG 1793/10.10 2010-10	Requirements for Flexible Front and Back Sheets for Photovoltaic Modules

IEC 61853-1* 2011-01	Photovoltaic (PV) module performance testing and energy rating - Part 1: Irradiance and temperature performance measurements and power rating
IEC 61853-2* 2016-09 (CDV)	Photovoltaic (PV) module performance testing and energy rating - Part 2: Spectral response, incidence angle and module operating temperature measurements
CEN/TR 15601* 2012-03	Hygrothermal performance of buildings - Resistance to wind-driven rain of roof coverings with discontinuously laid small elements - Test methods
EN 50583-1* 2016-01	Photovoltaics in buildings – Part 1: BIPV modules
EN 50583-2* 2016-01	Photovoltaics in buildings – Part 2: BIPV systems
ANSI/UL 2703* 2015-01	Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels
ISO 37* 2011-12	Rubber, vulcanized or thermoplastic - Determination of tensile stress-strain properties
ISO 813* 2010-08	Rubber, vulcanized or thermoplastic – Determination of adhesion to a rigid substrate – 90° peel method
ISO 4587* 2003-03	Adhesives – Determination of tensile lap-shear strength of rigid-to-rigid bonded assemblies
ISO 10147* 2011-09	Pipes and fittings made of crosslinked polyethylene (PE-X) - Estimation of the degree of crosslinking by determination of the gel content
IEC 62670-1* 2013-09	Photovoltaic concentrators (CPV) - Performance testing - Part 1: Standard conditions
IEC 62670-2* 2015-05	Photovoltaic concentrators (CPV) - Performance testing - Part 2: Energy measurement
IEC 62688 CD* 2011-09	Concentrator photovoltaic (CPV) module and assembly safety qualification

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IEC TS 62548* 2013-07	Photovoltaic (PV) arrays - Design requirements
IEC 62938* 2016-12	Non-uniform snow load testing for photovoltaic (PV modules)
2 PfG 2310/11.12 2012-11	Prüfung zur Qualifizierung von Photovoltaik-(PV)-Modulen unter der Einwirkung von inhomogenen Schneelasten
DIN EN 12211* 2000-12	Fenster und Türen – Windwiderstandsfähigkeit – Prüfverfahren
DIN EN 12179* 2000-09	Vorhangfassaden – Widerstand gegen Windlast – Prüfverfahren
UL 8703 Ed. 3* 2015-10	Concentrator photovoltaic modules and assemblies
IEC 61829* 2015-10	Photovoltaic (PV) array - On-site measurement of current-voltage characteristics
IEC 61724* 1998-04	Photovoltaic system performance monitoring - Guidelines for measurement, data exchange and analysis
QMA 2.581.90 Ed. 3 2012-11	Durchführung von Elektrolumineszenzaufnahmen
QMA 2.581.91 Ed. 5 2016-03	Gel-Content-Test
QMA 2.581.94 Ed. 1 2012-11	Peel-Test
QMA 2.581.95 Ed. 3 2014-10	Bestimmung der potentialinduzierten Degradation an Photovoltaik(PV)-Modulen
QMA 2.581.96 Ed. 1 2013-04	Bestimmung der Entzündbarkeit von Solarmodulen und -kollektoren (in Anlehnung an ISO 11925-2)
QMA 2.582.01 Ed. 6 2010-11	Performance Measurements of solar cells

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QMV 2.581 Ed. 3 2014-10	Type testing of photovoltaic (c-PV)-modules in accordance with IEC 61215 / IEC 61646 / IEC 61730 / ANSI UL 1701 / CPV
QMA 2.582.07 Ed. 6 2010-11	Type testing of DC isolating points
QMA 2.582.08 Ed. 6 2010-11	Type testing of PV-lightning systems (Performance)
QMA 2.582.09 Ed. 6 2010-11	Type testing of PV-charge regulators in Solar-Home-Systems
QMA 2.583.01 Ed. 9 2016-02	Qualifizierung netzgekoppelter Photovoltaik-(PV)-Anlagen
QMA 2.583.20 Ed. 1 2012-11	Monitoringauswertung
QMA 2.583.30 Ed. 1 2017-01	Blendgutachten
QMA 2.581.100 Ed. 2 2016-03	Prüfverfahren zur Bestimmung des Hagelwiderstandes von Bauprodukten
QMA 2.581.101 Ed. 2 2016-04	Winkelcharakteristik von Solargläsern und PV-Modulen
QMA 2.581.102 Ed. 2 2016-03	Reflexions- und Transmissionsmessung an Gläsern
QMA 2.584.10 Ed. 1 2014-06	Photovoltaic (PV) Module Logistics – Process and logistics qualification for the transportation of PV Modules
QMA 2.584.20 Ed. 2 2016-02	Qualifizierung von Installationsfachbetrieben für Photovoltaik (PV) Anlagen
QMA 2.584.30 Ed. 2 206-02	Qualifizierung von Fachbetrieben für die Wartung von Photovoltaik (PV) Anlagen
MCS 005 Issue 2.4 2015-09	Product Certification Scheme Requirements: Solar Photovoltaic Modules
MCS 012 Issue 2.0* 2015-11	Product Certification Scheme Requirements: Pitched Roof Installation Kits

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MCS 017 Issue 1.1* 2015-03	Product Certification Scheme Requirements: Bespoke Building Integrated Photovoltaic Products
VKF Prüfbestimmung Nr. 25* 2014-06	„Photovoltaik-Module“ – Stand 01.06.2014 / 25-12de / Version 1.02
IEC 62817* 2014-08	Photovoltaic systems – Design qualification of solar trackers
EN 62817 2018-09	Photovoltaische Systeme - Bauarteignung für Sonnen-Nachführeinrichtungen
IEC/TS 62804-1* 2015-08	Photovoltaic (PV) modules. Test methods for the detection of potential-induced degradation. Crystalline silicon
IEC TS 62804-1-1 2018-02 PCC Ed1	Photovoltaic (PV) modules. Test methods for the detection of potential-induced degradation – Part 1-1: Crystalline silicon - Delamination
IEC TS 62804-2 2017-01 ADTS Ed1	Photovoltaic (PV) modules. Test methods for the detection of potential-induced degradation – Part 2 Thin-film
IEC 62805-2 2017-08	Method for measuring photovoltaic (PV) glass – Part 2 Measurement of transmittance and reflection
DIN 52348* 1985-02	Testing of glass and plastics; abrasion test; sand trickling method

Solarthermie (ST)

AS/NZS 2712* 2007-09 + Amendment No. 1 2011-05 + Amendment No. 2 2011-11	Solar and heat pump water heaters – Design and construction (nur Section 4 und Appendix B bis G)
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ABNT NBR 15747-1* 2009-08 EN 12975-1 2006-03 +A1:2010*	Thermal solar systems and components - Solar collectors - Part 1: General requirements Thermal solar systems and components – Solar collectors – Part 1: General requirements
EN 12975-2* 2006-03	Thermal solar systems and components - Solar collectors - Part 2: Test methods
ABNT NBR 15747-2* 2009-08	Thermal solar systems and components - Solar collectors - Part 2: Test methods
EN 12976-1* 2006-01	Thermal solar systems and components - Factory made systems - Part 1: General requirements
EN 12976-2* 2006-01	Thermal solar systems and components - Factory made systems - Part 2: Test methods
EN 12977-1* 2012-04	Thermal solar systems and components - Custom built systems - Part 1: General requirements for solar water heaters and combisystems
EN 12977-2* 2012-04	Thermal solar systems and components - Custom built systems - Part 2: Test methods for solar water heaters and combisystems
EN 12977-3* 2012-04	Thermal solar systems and components - Custom built systems - Part 3: Performance test methods for solar water heater stores
EN 12977-4* 2012-04	Thermal solar systems and components - Custom built systems - Part 4: Performance test methods for solar combistores
EN 12977-5* 2012-04	Thermal solar systems and components - Custom built systems - Part 5: Performance test methods for control equipment
EN 15332* 2007-11	Heating Boilers - Energy assessment of hot water storage tanks
ISO 9459-2* 1995-08	Solar heating – Domestic water heating systems - Part 2: Outdoor test methods for system performance characterization and yearly performance prediction of solar-only systems

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ISO 9459-5* 2007-05	Solar heating – Domestic water heating systems – Part 5: System performance characterization by means of whole-systems tests and computer simulation
EN 12897* 2006-07	Water supply - Specification for indirectly heated unvented (closed) storage water heaters
SANS 6210* 2013-07	Domestic solar water heaters – Mechanical qualification tests
SANS 6211-1* 2012-04	Domestic solar water heaters – Part 1: Thermal performance using an outdoor test method
SANS 1307* 2012-08	Domestic solar water heaters
CSA F378* 2011-09	Solar Collectors
QMV 2.591 Ed. 3 2014-10	Qualifizierung Solarthermischer Systeme und Komponenten
QMA 2.592.01 Ed. 6 2016-04	Bauartzertifizierung von Solarthermischen Kollektoren – Allgemeine Anweisungen
QMA 2.593.01 Ed. 4 2014-10	Zuverlässigkeitsprüfungen von Flüssigkeits-kollektoren – Allgemeine Anweisungen
QMA 2.594.01 Ed. 4 2016-04	Prüfung von vorgefertigten Solaranlagen
QMA 2.595.01 Ed. 1 2016-04	Prüfung von kundenspezifisch gefertigten Solaranlagen – Allgemeine Anweisungen
QMA 2.596.01 Ed. 1 2013-04	Leistungsprüfung von Warmwasserspeichern für Solaranlagen – Allgemeine Anweisungen
Ashrea Standard* 93-2010 2014-01	Methods of testing to determine the thermal performance of solar collectors
AS/NZS 2535.1* 2007-03	Test methods solar collectors – thermal performance of glazed liquid heating collectors incl. pressure drop
SRCC TM1* 2016-03	SDHW System and Component Test Protocols

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EN ISO 9806* 2013-11	Solar energy - Solar thermal collectors - Test methods (ISO 9806:2013);
VKF Prüfbestimmung Nr. 19* 2014-06	„Thermische Sonnenkollektoren“ – Stand 01.06.2014 / 19-14de / Version 1.02
prEN 12975-1* 2013-05	Thermal solar systems and components - Solar collectors - Part 1: General requirements ¹

¹Die Anforderungen an ein Prüflaboratorium entsprechend Artikel 43 der Bauproduktenverordnung werden erfüllt. Prüfverfahren, die für die Feststellung des Produkttyps erforderlich sind und nicht durch den Urkundeninhaber selbst durchgeführt werden können, sind in der Liste der Unterauftragnehmer aufgeführt.

Die Harmonisierung der Norm ist in Vorbereitung. Nach der vorliegenden Fassung ist das System 3 zur Bewertung und Überprüfung der Leistungsbeständigkeit vorgesehen.

Umwelt

IEC 60068-2-1* 2007-03	Environmental testing - Part 2-1: Tests - Test A: Cold
IEC 60068-2-2* 2007-07	Environmental testing - Part 2-2: Tests - Test B: Dry heat
IEC 60068-2-5* 2010-04	Environmental testing - Part 2-5: Tests - Test Sa: Simulated solar radiation at ground level and guidance for solar radiation testing
IEC 60068-2-11* 1981-01	Basic environmental testing procedures - Part 2-11: Tests - Test Ka: Salt mist
IEC 60068-2-21* 2006-06	Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices
IEC 60068-2-30* 2005-08	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
IEC 60068-2-52* 1996-01	Environmental testing - Part 2: Tests, Test Kb: Salt mist, cyclic (sodium chloride solution)
IEC 60068-2-75* 2014-09	Environmental testing - Part 2: Tests; test Eh: Hammer tests
IEC 60068-2-78* 2012-10	Environmental testing - Part 2-78: Tests; Test Cab: Damp heat, steady state

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IEC 60068-3-5* 2001-08	Environmental testing - Part 3-5: Supporting documentation and guidance - Confirmation of the performance of temperature chambers
IEC 60068-3-6* 2001-08	Environmental testing - Part 3-6: Supporting documentation and guidance - Confirmation of the performance of temperature/humidity chambers
IEC 61345* 1998-02	UV test of photovoltaic (PV) modules
ISO 9227* 2012-05	Corrosion tests in artificial atmospheres - Salt spray tests
MIL-STD 810G* 2008-10 Method 510.5	Environmental Engineering Considerations and Laboratory Tests. Method 510.5 - Sand and Dust
VKF Prüfbestimmung 00a* Version 1.01	Allgemeiner Teil A
VKF Prüfbestimmung 00b* Version 1.01	Allgemeiner Teil B
DIN 50018* 2013-05	Prüfung im Kondenswasser-Wechselklima mit schwefeldioxidhaltiger Atmosphäre
DIN EN ISO 6988* 1997-03	Metallische und andere anorganische Überzüge – Prüfung mit Schwefeldioxid unter allgemeiner Feuchtigkeitskondensation
ASTM G87* 2002-10	Standard Practice for Conducting Moist SO ₂ Tests

verwendete Abkürzungen:

ANSI	American National Standards Institute
AS/NZS	Standards Australia
ASTM	American Society for Testing and Materials
CSA	Canadian Standards Association
MCS	Microgeneration Certification Scheme
MIL-STD	Military standard
PfG, QMA u. QMV	Hausverfahren
SANS	South African National Standards
SRCC TM	Solar Rating & Certification Cooperation
UL	Underwriters Laboratories
VDE	Verband der Elektrotechnik e. V.
VKF	Vereinigung Kantonalen Feuerversicherungen