



Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH German Accreditation Body

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1
subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation



The Deutsche Akkreditierungsstelle GmbH (German Accreditation Body) attests that the
testing laboratory

TÜV Rheinland Energie und Umwelt GmbH
Am Grauen Stein
51105 Köln

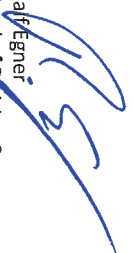
is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the
following fields:

**Renewable energies, photovoltaic and solar thermal systems and components, including
on-the-spot examination and outer surfaces of test equipment and environmental
simulation**

The accreditation certificate shall only apply in connection with the notice of accreditation of 25.02.2011
with the accreditation number D-PL-11120-01-01 and is valid until 29.07.2013. It comprises the cover
sheet, the reverse side of the cover sheet and the following annex with a total of 8 pages.

Registration number of the certificate: **D-PL-11120-01-01**

Frankfurt am Main, 25.02.2011


Ralf Egener
Head of Division 2

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf.



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Annex to the Accreditation Certificate D-PL-11120-01-01 according to DIN EN ISO/IEC 17025:2005

Period of validity: 25.02.2011 to 29.07.2013

Holder of certificate:

TÜV Rheinland Energie und Umwelt GmbH
Am Grauen Stein
51105 Köln

Tests in the fields:

Renewable energies, photovoltaic and solar thermal systems and components, including on-the-spot examination and outer surfaces of test equipment and environmental simulation

Test Area	Standard	Title of Standard / Test procedure	Restriction
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 60891	Procedures for temperature and irradiance corrections to measure IV characteristics of crystalline silicon photovoltaic devices	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 60904-1	Photovoltaic devices; part 1: measurement of photovoltaic current-voltage characteristics	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 60904-2	Photovoltaic devices; part 2: requirements for reference solar cells	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 60904-3	Photovoltaic devices; part 3: measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 60904-5	Photovoltaic devices, part 5: determination of the equivalent cell temperature (ECT) of photovoltaic (PV) devices by the open-circuit voltage method	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 60904-6	Photovoltaic devices, part 6: requirements for reference solar modules	

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Test Area	Standard	Title of Standard / Test procedure	Restriction
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 60904-9	Photovoltaic devices - part 9: Solar simulator performance requirements	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 60904-10	Photovoltaic devices - part 10: Methods of linearity measurement	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 61215	Crystalline silicon terrestrial photovoltaic (PV) modules; design qualification and type approval	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 61646	Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 61702	Rating of direct coupled photovoltaic (PV) pumping systems	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 61730-1	Photovoltaic module safety qualification – Part 1: Requirements for construction	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 61730-2	Photovoltaic module safety qualification – Part 2: Requirements for testing	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 61683	Photovoltaic systems - Power conditioners - Procedure for measuring the efficiency	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 61727	Photovoltaic (PV) systems - Characteristics of the utility interface	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 60364-7-712	Electrical installations of buildings - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 62093	BOS components – Environmental reliability testing – Design qualification and type approval	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 62108	Concentrator photovoltaic (CPV) modules and assemblies - Design qualification and type approval	
Photovoltaik (PV) <i>Photovoltaic</i>		approval	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 62124	Photovoltaic (PV) stand-alone systems – Design qualification and type approval	
Photovoltaik (PV) <i>Photovoltaic</i>	UL 1703	Flat-Plate Photovoltaic Modules and Panels	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 61701	Salt mist corrosion testing of photovoltaic (PV) modules	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 62446	Gid connected photovoltaic systems – Minimum requirements for system documentation, commissioning tests and inspection	



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Photovoltaik (PV) <i>Photovoltaic</i>	EN 50380	Datasheet and nameplate information for photovoltaic modules	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.01	Performance Measurement of solar cells	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.02	Type testing of photovoltaic PV-modules in accordance with IEC 61215 / IEC 61646	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.03	Type testing of PV-inverters	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.04	Type testing of PV-pump systems	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.07	Type testing of PV-supplied freezer and refrigeration appliances in	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.08	Type testing of PV-generator terminal boxes	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.09	Type testing regarding the electrical safety of PV-modules	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.10	Individual acceptance test of grid-connected PV-systems	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.12	Type testing of DC isolating points	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.13	Type testing of partial discharge in insulation foils	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.20	Type testing of PV-lighting systems (Performance)	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.21	Type testing of PV-charge regulators in Solar-Home-Systems	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.30	Type testing of photovoltaic PV-modules in accordance with IEC 61730	
Photovoltaik (PV) <i>Photovoltaic</i>	QMA 2.572.40	Type testing of concentrating photovoltaic CPV-modules in accordance with IEC 62108	
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 61701	Salt mist corrosion testing of photovoltaic (PV) modules	

Period of validity: 25.02.2011 to 29.07.2013

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Test Area	Standard	Title of Standard / Test procedure	Restriction
Photovoltaik (PV) <i>Photovoltaic</i>	IEC 62446	Grid connected photovoltaic systems – Minimum requirements for system documentation, commissioning tests and inspection	
Photovoltaik (PV) <i>Photovoltaic</i>	EN 50380	Datasheet and nameplate information for photovoltaic modules	
Solarthermie	AS/ NZS 2712	Solar and heat pump water heaters – Design and construction	
Solarthermie	EN 12975-1	Thermal solar systems and components - Solar collectors - Part 1: General requirements	
Solarthermie	EN 12975-2	Thermal solar systems and components - Solar collectors - Part 2: Test methods	
Solarthermie	EN 12976-1	Thermal solar systems and components – Factory made systems - Part 1: General requirements	
Solarthermie	EN 12976-2	Thermal solar systems and components - Factory made systems - Part 2: Test methods	
Solarthermie	EN TS 12977-1	Thermal solar systems and components – Custom built systems - Part 1: General requirements	
Solarthermie	EN 12977-3	Thermal solar systems and components - Custom built systems - Part 3: Performance characterisation of stores for solar heating systems	
Solarthermie	ISO 9459-2	Solar heating – Domestic water heating systems – Part 2: Outdoor test method for system performance characterisation and yearly performance prediction of solar-only systems	
Solarthermie	ISO 9459-5	Solar heating – Domestic water heating systems – Part 5: System performance characterisation by means of whole-system tests and computer simulation	
Solarthermie	ISO 9806-1	Test methods for solar collectors – Part 1: Thermal Performance of glazed liquid heating collectors including pressure drop	
Solarthermie	ISO 9806-2	Test methods for solar collectors – Part 2: Qualification test procedures	
Solarthermie	SABS method 1210	Domestic solar water heaters – Mechanical qualification tests	
Solarthermie	SANS 6211-1	Domestic solar water heaters – Part 1: Thermal performance using an outdoor test method	

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Test Area	Standard	Title of Standard / Test procedure	Restriction
Solarthermie	SANS 1307 (SANS 1210)	Domestic solar water heaters	
Solarthermie	CSA F378:2004	Solar Collectors	
Solarthermie	Ashrea Standard 93-2003	Methods of testing to determine the thermal performance of solar collectors	
Solarthermie	AS/NZS 2535.1:2007	Test methods solar collectors – thermal performance of glazed liquid heating collectors incl. pressure drop (ISO 9806-1:1994, MOD)	
Solarthermie	SRCC TM1:2008	SDHW System and Component Test Protocols	
Solarthermie	QMA 2.576.01	Type testing of solar thermal (ST) (water-) collectors in accordance with EN 12975 and ISO 9806	
Solarthermie	QMA 2.576.02	Performance characterisation of stores for solar heating systems in accordance with EN 12977-3	
Solarthermie	QMA 2.576.03	Type testing of factory made systems in accordance with EN 12976 in combination with ISO 9459-2 or ISO 9459-5	
Solarthermie	QMA 2.576.04	Type testing of custom built systems in accordance with TS 12977	
Solarthermie	QMA 2.576.06	Type testing of solar thermal (ST) (water-) collectors in accordance with AS/NZS 2712 chapter 4.5; 4.6; 4.7 and 4.11	
Solarthermie	QMA 2.576.07	Type testing of solar thermal (ST) (water-) collectors in accordance with SABS method 1210	
Solarthermie	CSA F378:2004	Solar Collectors	
Solarthermie	Ashrea Standard 93-2003	Methods of testing to determine the thermal performance of solar collectors	
Solarthermie	AS/NZS 2535.1:2007	Test methods solar collectors – thermal performance of glazed liquid heating collectors incl. pressure drop (ISO 9806-1:1994, MOD)	
Solarthermie	SRCC TM1:2008	SDHW System and Component Test Protocols	
Safety	EN 50178	Electronic equipment for use in power installations	
Safety	IEC 60146-1-1	Semiconductor converters; general requirements and line commutated converters; part 1-1: Specifications of basic requirements	

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Test Area	Standard	Title of Standard / Test procedure	Restriction
Safety	IEC 60146-2	Semiconductor converters - part 2: Self-commutated semiconductor converters including direct d.c. converters	
Safety	IEC 60270	High-Voltage test techniques – Partial discharge measurements	
Safety	IEC 60364-7-712	Errichten von Niederspannungsanlagen - Teil 7-712: Anforderungen für spezielle Anlagen und Räume: Photovoltaik-Versorgungssysteme	
Safety	IEC 60664-1	Isolation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests	
Safety	IEC 60901	Single-capped fluorescent lamps -Performance specifications	
Safety	IEC 60921	Ballasts for tubular fluorescent lamps - Performance requirements	
Safety	IEC 61347-1	Lamp controlgear - Part 1: General and safety requirements	
Safety	IEC 61347-2-4	Lamp controlgear - Part 2-4: Particular requirements for d.c. supplied electronic ballasts for general lighting	
Safety	IEC 61347-2-8	Lamp controlgear - Part 2-8: Particular requirements for ballasts for fluorescent lamps	
Safety	IEC 60925	D. C. supplied electronic ballasts for tubular fluorescent lamps; performance requirements	
Safety	IEC/TR 61800-6	Adjustable speed electrical power drive systems - Part 6: Guide for determination of types of load duty and corresponding current ratings	
Safety	DIN VDE 0100-100	<i>Errichten von Niederspannungsanlagen - Teil 100: Anwendungsbereich, Zweck und Grundsätze</i>	
Safety	DIN VDE 0100-410	Erection of power installations with nominal voltages up to 1000 V - Part 4: Protection for safety : Chapter 41 : Protection against electric shock	
Safety	DIN VDE 0100-443	Errichten von Niederspannungsanlagen - Teil 4: Schutzmaßnahmen; Kapitel 44: Schutz bei Überspannungen; Hauptabschnitt 443: Schutz bei Überspannungen infolge atmosphärischer Einflüsse oder von Schaltvorgängen	



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Safety	DIN VDE 0100-520	Errichten von Niederspannungsanlagen - Teil 5: Auswahl und Errichtung elektrischer Betriebsmitteln; Kapitel 52: Kabel- und Leitungsanlagen	
Safety	VDE 0100 Teil 600	Errichten von Niederspannungsanlagen - Teil 6: Prüfungen	
Safety	DIN VDE 0100-731	Errichten von Starkstromanlagen mit Nennspannungen bis 1000 V; Elektrische Betriebsstätten und abgeschlossene elektrische Betriebsstätten	
Safety	DIN VDE 0105-1	Betrieb von elektrischen Anlagen;	
Safety	DIN EN 61140	Protection against electric shock; Basis requirements for protective separation in electrical equipment	
Safety	DIN VDE 0110-1	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	
Safety	DIN VDE 0126	Automatic disconnecting facility for photovoltaic installations with a rated output $\leq 4,6$ kVA and a single-phase parallel feed by means of an inverter into the public low-voltage mains	
Safety	VDE 0185-1	Blitzschutz - Teil 1: Allgemeine Grundsätze	
Safety	VDE 0185-2	Blitzschutz - Teil 2: Risiko-Management	
Safety	DIN EN ISO 9906	Acceptance tests for centrifugal pumps	
Energie Effizienz Energy Efficiency	WHO-Test Specification E3/RF4:	Equipment performance specification for refrigerators and freezers	
Energie Effizienz Energy Efficiency	WHO-Test Specification E3/PROC/7:	Solar (PV) Refrigerator and Icepack freezers	
Umwelt	IEC 60068-2-1	Environmental testing; part 2: tests; test A: cold	
Umwelt	IEC 60068-2-2	Basic environmental testing procedures; Part 2: Tests; Test B: Dry Heat	
Umwelt	IEC 60068-2-78	Environmental testing – Part 2-78: Tests; Test Cab: Damp Heat, steady state	

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Test Area	Standard	Title of Standard / Test procedure	Restriction
Umwelt	IEC 60068-2-5	Environmental testing – Part 2-5: Test Sa: Simulated solar radiation at ground level	
Umwelt	IEC 60068-2-6	Environmental testing - Part 2: Tests; Test Fc: Vibration (sinusoidal)	
Umwelt	IEC 60068-2-21	Environmental testing - Part 2-21: Tests; Test U: Robustness of terminations and integral mounting devices	
Umwelt	IEC 60068-2-27	Environmental testing; Part 2: Tests; Test Ea and guidance: Shock	
Umwelt	IEC 60068-2-30	Basic environmental testing procedures; Part 2: Tests; Test Db and guidance: Damp Heat, cyclic (12 + 12-hour cycle)	
Umwelt	IEC 60068-2-33	Basic environmental testing procedures; Part 2: Tests; Guidance on change of temperature tests	
Umwelt	IEC 60068-2-75	Environmental testing; Part 2: Tests; Test Eh: Hammer tests	
Umwelt	IEC 61345	UV Test for photovoltaic (PV) modules	
Umwelt	IEC 61721	Susceptibility of a photovoltaic (PV) module to accidental impact damage (resistance to impact test)	

Abbreviations used:

DIN Deutsches Institut für Normung e.V.
NDS In house method of the CAB