

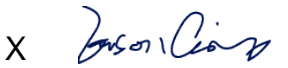


Prüfbericht-Nr.: <i>Test report no.:</i>	50173415 056	Auftrags-Nr.: <i>Order no.:</i>	244346446 etc. (refer to page xx)	Seite 1 von 206 Page 1 of 206
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	2003740	Auftragsdatum: <i>Order date:</i>	12/07/2021 to 28/10/2021	
Auftraggeber: <i>Client:</i>	Jinko Solar Co., Ltd. No.1 Jinko Road, Shangrao Economic Development Zone, Jiangxi, 334100, P. R. China			
Prüfgegenstand: <i>Test item:</i>	Photovoltaic (PV) module			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	See module type designation on page 3-10			
Auftrags-Inhalt: <i>Order content:</i>	Design qualification and type approval of photovoltaic (PV) modules			
Prüfgrundlage: <i>Test specification:</i>	Photovoltaic (PV) modules IEC 61215-1:2016; IEC 61215-1-1:2016; IEC 61215-2:2016; IEC 61730-1:2016; IEC 61730-2:2016; EN 61215-1:2016; EN 61215-1-1:2016; EN 61215-2:2017; EN IEC 61730-1:2018; EN IEC 61730-2:2018			
Wareneingangsdatum: <i>Date of sample receipt:</i>	12/07/2021-01/11/2021			
Prüfmuster-Nr.: <i>Test sample no.:</i>	See clause 6			
Prüfzeitraum: <i>Testing period:</i>	12/07/2021-20/01/2022			
Ort der Prüfung: <i>Place of testing:</i>	Refer to page 15			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	X 	genehmigt von: <i>authorized by:</i>	X 	
Datum: <i>Date:</i>	30/01/2022	Ausstellungsdatum: <i>Issue date:</i>	30/01/2022	
Stellung / Position:	Project Engineer	Stellung / Position:	Authorizer	
Sonstiges / Other: - Extension to alternative materials and combinations. - Refer to pages 15-26 and Constructional Data Form (CDF) No. 50173415 056 for more details.				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
<p>* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet</p> <p>* Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested</p>				
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>				

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Anmerkungen
Remarks

1	<p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p>
2	<p>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben.</p> <p><i>As contractually agreed, this document has been signed digitally only. TÜV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TÜV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged.</i></p>
3	<p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p>
4	<p>Die Entscheidungsregel für Konformitätserklärungen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird.</p> <p><i>The decision rule for statements of conformity in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report.</i></p>

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Produktbeschreibung
Product description

I	General
1	Product details
1.1	<p>Module type designation</p> <p>Approved model types: Max. system voltage (Up to 1500VDC) With ½ cut of mono c-Si cells:</p> <p>JKxxxN-66H5-BTV (xxx=635-670, in steps of 5, 132 cells) JKMxxxM-72HL4-V, JKMxxxM-72HL4-V-J, JKMxxxM-72HL4-S-V, JKMxxxM-72HL4-S-V-J (xxx=560-570, in steps of 5, 144 cells) JKMxxxM-60HL4-V, JKMxxxM-60HL4-S-V (xxx=465-470, in steps of 5, 120 cells) JKMxxxM-72HL4-TV, JKMxxxM-72HL4-TV-J, JKMxxxM-72HL4-S-TV, JKMxxxM-72HL4-S-TV-J (xxx=555-565, in steps of 5, 144 cells) JKMxxxN-78HL4-TV (xxx=570-605, in steps of 5, 156 cells) JKMxxxN-78HL4-V (xxx=570-625, in steps of 5, 156 cells) JKMxxxN-7RL3-S-TV, JKMxxxN-7RL3-S-TV-J (xxx=425-500, in steps of 5, 156 cells) JKMxxxN-6RL3-S-TV, JKMxxxN-6RL3-S-TV-J (xxx=355-420, in steps of 5, 132 cells) JKMxxxN-6TL3-S-TV (xxx=325-380, in steps of 5, 120 cells) JKMxxxN-7RL3-S-B-V (xxx=425-480, in steps of 5, 156 cells) JKMxxxN-6RL3-S-B-V (xxx=360-405, in steps of 5, 132 cells) JKMxxxN-6TL3-S-B-V (xxx=320-365, in steps of 5, 120 cells) JKMxxxM-7RL3-S-V, JKMxxxM-7RL3-S-V-J (xxx=430-495, in steps of 5, 156 cells) JKMxxxM-6RL3-S-V, JKMxxxM-6RL3-S-V-J, JKMSxxxM-6RL3-V-MX3 (xxx=360-415, in steps of 5, 132 cells) JKMxxxM-6TL3-S-V, JKMSxxxM-6TL3-V-MX3 (xxx=335-380, in steps of 5, 120 cells) JKMxxxM-7RL3-S-TV, JKMxxxM-7RL3-S-TV-J (xxx=420-475, in steps of 5, 156 cells) JKMxxxM-6RL3-S-TV, JKMxxxM-6RL3-S-TV-J (xxx=355-400, in steps of 5, 132 cells) JKMxxxM-6TL3-S-TV (xxx=325-365, in steps of 5, 120 cells) JKMxxxM-7RL3-S-B-V (xxx=425-480, in steps of 5, 156 cells) JKMxxxM-6RL3-S-B-V (xxx=360-405, in steps of 5, 132 cells) JKMxxxM-6TL3-S-B-V (xxx=320-365, in steps of 5, 120 cells) JKMxxxM-78HL4-S-V (xxx=565-605, in steps of 5, 156 cells) JKMxxxM-72HL4-S-V, JKMxxxM-72HL4-S-V-J (xxx=475-555, in steps of 5, 144 cells) JKMxxxM-66HL4-S-V (xxx=440-505, in steps of 5, 132 cells) JKMxxxM-60HL4-S-V (xxx=400-460, in steps of 5, 120 cells) JKMxxxM-54HL4-S-V (xxx=360-420, in steps of 5, 108 cells) JKMxxxM-78HL4-S-TV (xxx=555-595, in steps of 5, 156 cells) JKMxxxM-72HL4-S-TV, JKMxxxM-72HL4-S-TV-J (xxx=475-550, in steps of 5, 144 cells) JKMxxxM-66HL4-S-TV (xxx=440-500, in steps of 5, 132 cells) JKMxxxM-60HL4-S-TV (xxx=400-455, in steps of 5, 120 cells) JKMxxxM-54HL4-S-TV (xxx=360-410, in steps of 5, 108 cells) JKMxxxM-72HL4-S-B-V (xxx=510-535, in steps of 5, 144 cells) JKMxxxM-66HL4-S-B-V (xxx=465-490, in steps of 5, 132 cells) JKMxxxM-60HL4-S-B-V (xxx=425-445, in steps of 5, 120 cells) JKMxxxM-54HL4-S-B-V (xxx=380-400, in steps of 5, 108 cells) JKMSxxxN-6RL3-V-MX3 (xxx=360-420, in steps of 5, 132 cells) JKMSxxxN-6TL3-V-MX3 (xxx=335-380, in steps of 5, 120 cells)</p>

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JKMxxxM-78HL4-V (xxx=565-605, in steps of 5, 156 cells)
MMxxx-78HLD-MBV (xxx=565-605, in steps of 5, 156 cells)
JKMxxxM-78HL4-TV (xxx=555-595, in steps of 5, 156 cells)
JKxxxM-66R5-MWV (xxx=630-665, in steps of 5, 132 cells)
JKxxxM-66R5-BTV (xxx=630-660, in steps of 5, 132 cells)
JKxxxM-66H5-MWV (xxx=635-670, in steps of 5, 132 cells)
JKxxxM-66H5-BTV (xxx=630-665, in steps of 5, 132 cells)
MNxxx-72HLD-MBV (xxx=485-555, in steps of 5, 144 cells)
MNxxx-66HLD-MBV (xxx=445-505, in steps of 5, 132 cells)
MNxxx-60HLD-MBV (xxx=405-460, in steps of 5, 120 cells)
MNxxx-54HLD-MBV (xxx=365-415, in steps of 5, 108 cells)
MNxxx-72HLD-BBV (xxx=480-545, in steps of 5, 144 cells)
MNxxx-66HLD-BBV (xxx=440-495, in steps of 5, 132 cells)
MNxxx-60HLD-BBV (xxx=400-450, in steps of 5, 120 cells)
MNxxx-54HLD-BBV (xxx=360-405, in steps of 5, 108 cells)
MNxxx-7RLD-MBV (xxx=535-590, in steps of 5, 156 cells)
MNxxx-7TLD-MBV (xxx=495-540, in steps of 5, 144 cells)
MNxxx-6RLD-MBV (xxx=455-495, in steps of 5, 132 cells)
MNxxx-6TLD-MBV (xxx=415-450, in steps of 5, 120 cells)
MNxxx-5RLD-MBV (xxx=375-405, in steps of 5, 108 cells)
MNxxx-7RLD-BBV (xxx=520-585, in steps of 5, 156 cells)
MNxxx-7TLD-BBV (xxx=480-540, in steps of 5, 144 cells)
MNxxx-6RLD-BBV (xxx=440-495, in steps of 5, 132 cells)
MNxxx-6TLD-BBV (xxx=400-450, in steps of 5, 120 cells)
MNxxx-5RLD-BBV (xxx=365-405, in steps of 5, 108 cells)
JKMxxxM-72HLM-TV (xxx=425-460, in steps of 5, 144 cells)
JKMxxxM-60HLM-TV (xxx=355-380, in steps of 5, 120 cells)
JKMSxxxM-72H-MBB-V-MX3 (xxx=385-425, in steps of 5, 144 cells)
JKMSxxxM-60H-MBB-V-MX3 (xxx=320-355, in steps of 5, 120 cells)
JKMSxxxM-72HLM-V-MX3 (xxx=420-465, in steps of 5, 144 cells)
JKMSxxxM-60HLM-V-MX3 (xxx=350-385, in steps of 5, 120 cells)
JKMSxxxM-78H-MBB-V-MX3 (xxx=440-465, in steps of 5, 156 cells)
JKMSxxxM-66H-MBB-V-MX3 (xxx=370-390, in steps of 5, 132 cells)
JKMxxxM-72HLM-B-V, JKMSxxxM-72HLM-B-V-MX3 (xxx=415-445, in steps of 5, 144 cells)
JKMxxxM-60HLM-B-V, JKMSxxxM-60HLM-B-V-MX3 (xxx=350-370, in steps of 5, 120 cells)
MMxxx-72HLD-MBV (xxx=475-555, in steps of 5, 144 cells)
MMxxx-66HLD-MBV (xxx=440-505, in steps of 5, 132 cells)
MMxxx-60HLD-MBV (xxx=400-460, in steps of 5, 120 cells)
MMxxx-54HLD-MBV (xxx=360-420, in steps of 5, 108 cells)
MMxxx-7RLD-MBV (xxx=535-590, in steps of 5, 156 cells)
MMxxx-7TLD-MBV (xxx=495-540, in steps of 5, 144 cells)
MMxxx-6RLD-MBV (xxx=455-495, in steps of 5, 132 cells)
MMxxx-6TLD-MBV (xxx=415-450, in steps of 5, 120 cells)
MMxxx-5RLD-MBV (xxx=375-405, in steps of 5, 108 cells)
MMxxx-72HLA-BBV-MBB (xxx=385-405, in steps of 5, 144 cells)

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Product description

MMxxx-60HLA-BBV-MBB (xxx=320-335, in steps of 5, 120 cells)
MMxxx-72HLA-MBV-MBB, SMMxxx-72HLA-MBV-MBB-TI (xxx=385-425, in steps of 5, 144 cells)
MMxxx-60HLA-MBV-MBB, SMMxxx-60HLA-MBV-MBB-TI (xxx=320-355, in steps of 5, 120 cells)
MMxxx-72HLM-MBV (xxx=420-465, in steps of 5, 144 cells)
MMxxx-60HLM-MBV (xxx=350-385, in steps of 5, 120 cells)
MM-72HLA-BBV-MBB (xxx=385-405, in steps of 5, 144 cells)
MM-60HLA-BBV-MBB (xxx=320-335, in steps of 5, 120 cells)
MMxxx-7RLC-BBV (xxx=420-475, in steps of 5, 156 cells)
MMxxx-6RLC-BBV (xxx=355-400, in steps of 5, 132 cells)
MMxxx-6TLC-BBV (xxx=325-365, in steps of 5, 120 cells)
MMxxx-7RLC-MBV, SMMxxx-7RLC-MBV-TI (xxx=430-475, in steps of 5, 156 cells)
MMxxx-6RLC-MBV, SMMxxx-6RLC-MBV-TI (xxx=360-400, in steps of 5, 132 cells)
MMxxx-6TLC-MBV, SMMxxx-6TLC-MBV-TI (xxx=335-365, in steps of 5, 120 cells)
MMxxx-7RLC-ABV, SMMxxx-7RLC-ABV-TI (xxx=425-480, in steps of 5, 156 cells)
MMxxx-6RLC-ABV, SMMxxx-6RLC-ABV-TI (xxx=360-405, in steps of 5, 132 cells)
MMxxx-6TLC-ABV, SMMxxx-6TLC-ABV-TI (xxx=320-365, in steps of 5, 120 cells)
MMxxx-78HLA-MBV-MBB (xxx=440-465, in steps of 5, 156 cells)
MMxxx-66HLA-MBV-MBB (xxx=370-390, in steps of 5, 132 cells)
MMxxx-78HLA-MBV, SMMxxx-78HLA-MBV-TI (xxx=405-465, in steps of 5, 156 cells)
MMxxx-66HLA-MBV, SMMxxx-66HLA-MBV-TI (xxx=340-390, in steps of 5, 132 cells)
MMxxx-78HLA-ABV, SMMxxx-78HLA-ABV-TI (xxx=405-435, in steps of 5, 156 cells)
MMxxx-66HLA-ABV, SMMxxx-66HLA-ABV-TI (xxx=340-365, in steps of 5, 132 cells)
SMMxxx-72HLA-MBV-MX3, SMMxxx-72HLA-ABV-MX3 (xxx=335-395, in steps of 5, 144 cells)
SMMxxx-60HLA-MBV-MX3, SMMxxx-60HLA-ABV-MX3 (xxx=270-340, in steps of 5, 120 cells)
MMxxx-72HLA-BBV (xxx=375-425, in steps of 5, 144 cells)
MMxxx-60HLA-BBV (xxx=315-355, in steps of 5, 120 cells)
MMxxx-60HLA-MBV, MMxxx-60HLA-ABV, SMMxxx-60HLA-MBV-TI, SMMxxx-60HLA-ABV-TI
(xxx=270-350, in steps of 5, 120 cells)
MMxxx-72HLA-MBV, MMxxx-72HLA-ABV, SMMxxx-72HLA-MBV-TI, SMMxxx-72HLA-ABV-TI
(xxx=335-425, in steps of 5, 144 cells)
MMxxx-78HLA-BBV (xxx=405-455, in steps of 5, 156 cells)
MNxxx-72HLA-BBV-MBB (xxx=390-420, in steps of 5, 144 cells)
MNxxx-60HLA-BBV-MBB (xxx=330-350, in steps of 5, 120 cells)
MNxxx-7RLC-MBV, SMNxxx-7RLC-MBV-TI (xxx=430-475, in steps of 5, 156 cells)
MNxxx-6RLC-MBV, SMNxxx-6RLC-MBV-TI (xxx=360-400, in steps of 5, 132 cells)
MNxxx-6TLC-MBV, SMNxxx-6TLC-MBV-TI (xxx=335-365, in steps of 5, 120 cells)
MNxxx-7RLC-BBV (xxx=425-475, in steps of 5, 156 cells)
MNxxx-6RLC-BBV (xxx=355-400, in steps of 5, 132 cells)
MNxxx-6TLC-BBV (xxx=325-365, in steps of 5, 120 cells)
MNxxx-72HLA-MBV-MBB, SMNxxx-72HLA-MBV-MBB-TI (xxx=385-425, in steps of 5, 144 cells)
MNxxx-60HLA-MBV-MBB, SMNxxx-60HLA-MBV-MBB-TI (xxx=320-350, in steps of 5, 120 cells)
MNxxx-7RLC-ABV, SMNxxx-7RLC-ABV-TI (xxx=425-480, in steps of 5, 156 cells)
MNxxx-6RLC-ABV, SMNxxx-6RLC-ABV-TI (xxx=360-405, in steps of 5, 132 cells)
MNxxx-6TLC-ABV, SMNxxx-6TLC-ABV-TI (xxx=320-365, in steps of 5, 120 cells)
MNxxx-72HLA-ABV-MBB, SMNxxx-72HLA-ABV-MBB-TI (xxx=380-400, in steps of 5, 144 cells)

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MNxxx-60HLA-ABV-MBB, SMNxxx-60HLA-ABV-MBB-TI (xxx=315-330, in steps of 5, 120 cells)
MMxxx-66HLA-BBV (xxx=340-385, in steps of 5, 132 cells)
JKMxxxN-72HL4-V (xxx=485-575, in steps of 5, 144 cells)
JKMxxxN-66HL4-V (xxx=445-525, in steps of 5, 132 cells)
JKMxxxN-60HL4-V (xxx=405-480, in steps of 5, 120 cells)
JKMxxxN-54HL4-V (xxx=365-430, in steps of 5, 108 cells)
JKMxxxN-72HL4-TV (xxx=480-555, in steps of 5, 144 cells)
JKMxxxN-66HL4-TV (xxx=440-510, in steps of 5, 132 cells)
JKMxxxN-60HL4-TV (xxx=400-465, in steps of 5, 120 cells)
JKMxxxN-54HL4-TV (xxx=360-415, in steps of 5, 108 cells)
JKMxxxN-7RL4-V (xxx=535-590, in steps of 5, 156 cells)
JKMxxxN-7TL4-V (xxx=495-570, in steps of 5, 144 cells)
JKMxxxN-6RL4-V (xxx=455-495, in steps of 5, 132 cells)
JKMxxxN-6TL4-V (xxx=415-450, in steps of 5, 120 cells)
JKMxxxN-5RL4-V (xxx=375-405, in steps of 5, 108 cells)
JKMxxxN-7RL4-TV (xxx=520-585, in steps of 5, 156 cells)
JKMxxxN-7TL4-TV (xxx=480-570, in steps of 5, 144 cells)
JKMxxxN-6RL4-TV (xxx=440-495, in steps of 5, 132 cells)
JKMxxxN-6TL4-TV (xxx=400-450, in steps of 5, 120 cells)
JKMxxxN-5RL4-TV (xxx=365-405, in steps of 5, 108 cells)
JKMxxxM-72HL4-B-V (xxx=510-535, in steps of 5, 144 cells)
JKMxxxM-66HL4-B-V (xxx=465-490, in steps of 5, 132 cells)
JKMxxxM-60HL4-B-V (xxx=425-445, in steps of 5, 120 cells)
JKMxxxM-54HL4-B-V (xxx=380-400, in steps of 5, 108 cells)
JKMxxxN-7RL4-TV (xxx=520-585, in steps of 5, 156 cells)
JKMxxxN-7TL4-TV (xxx=480-570, in steps of 5, 144 cells)
JKMxxxN-6RL4-TV (xxx=440-495, in steps of 5, 132 cells)
JKMxxxN-6TL4-TV (xxx=400-450, in steps of 5, 120 cells)
JKMxxxN-5RL4-TV (xxx=365-405, in steps of 5, 108 cells)
JKMxxxM-72HL4-B-V (xxx=510-535, in steps of 5, 144 cells)
JKMxxxM-66HL4-B-V (xxx=465-490, in steps of 5, 132 cells)
JKMxxxM-60HL4-B-V (xxx=425-445, in steps of 5, 120 cells)
JKMxxxM-54HL4-B-V (xxx=380-400, in steps of 5, 108 cells)
JKMxxxN-72HL4-B-V (xxx=510-535, in steps of 5, 144 cells)
JKMxxxN-66HL4-B-V (xxx=465-490, in steps of 5, 132 cells)
JKMxxxN-60HL4-B-V (xxx=425-445, in steps of 5, 120 cells)
JKMxxxM-7RL4-B-V (xxx=540-575, in steps of 5, 156 cells)
JKMxxxM-7TL4-B-V (xxx=495-530, in steps of 5, 144 cells)
JKMxxxM-6RL4-B-V (xxx=455-485, in steps of 5, 132 cells)
JKMxxxM-6TL4-B-V (xxx=415-440, in steps of 5, 120 cells)
JKMxxxM-5RL4-B-V (xxx=375-395, in steps of 5, 108 cells)
JKMxxxN-7RL4-B-V (xxx=540-575, in steps of 5, 156 cells)
JKMxxxN-7TL4-B-V (xxx=495-530, in steps of 5, 144 cells)
JKMxxxN-54HL4-B-V (xxx=380-400, in steps of 5, 108 cells)
JKMxxxN-6RL4-B-V (xxx=455-485, in steps of 5, 132 cells)

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JKMxxxN-6TL4-B-V (xxx=415-440, in steps of 5, 120 cells)
JKMxxxN-5RL4-B-V (xxx=375-395, in steps of 5, 108 cells)
JKMxxxM-7RL4-TV, JKMxxxM-7RL4-TV-J (xxx=525-590, in steps of 5, 156 cells)
JKMxxxM-7TL4-TV, JKMxxxM-7TL4-TV-J (xxx=485-570, in steps of 5, 144 cells)
JKMxxxM-6RL4-TV (xxx=445-495, in steps of 5, 132 cells)
JKMxxxM-6TL4-TV (xxx=405-450, in steps of 5, 120 cells)
JKMxxxM-5RL4-TV (xxx=365-405, in steps of 5, 108 cells)
JKMxxxM-7RL4-V, JKMxxxM-7RL4-V-J (xxx=535-590, in steps of 5, 156 cells)
JKMxxxM-7TL4-V, JKMxxxM-7TL4-V-J (xxx=495-570, in steps of 5, 144 cells)
JKMxxxM-6RL4-V (xxx=455-495, in steps of 5, 132 cells)
JKMxxxM-6TL4-V (xxx=415-450, in steps of 5, 120 cells)
JKMxxxM-5RL4-V (xxx=375-405, in steps of 5, 108 cells)
JKMxxxM-72HL4-V, JKMxxxM-72HL4-V-J (xxx=475-555, in steps of 5, 144 cells)
JKMxxxM-66HL4-V (xxx=440-505, in steps of 5, 132 cells)
JKMxxxM-60HL4-V (xxx=400-460, in steps of 5, 120 cells)
JKMxxxM-54HL4-V (xxx=360-420, in steps of 5, 108 cells)
JKMxxxM-72HL4-TV, JKMxxxM-72HL4-TV-J (xxx=475-550, in steps of 5, 144 cells)
JKMxxxM-66HL4-TV (xxx=440-500, in steps of 5, 132 cells)
JKMxxxM-60HL4-TV (xxx=400-455, in steps of 5, 120 cells)
JKMxxxM-54HL4-TV (xxx=360-410, in steps of 5, 108 cells)
JKMxxxM-6TL3-B-V, JKMSxxxM-6TL3-B-V-TI (xxx=320-365, in steps of 5, 120 cells)
JKMxxxN-6TL3-B-V, JKMSxxxN-6TL3-B-V-TI (xxx=320-365, in steps of 5, 120 cells)
JKMxxxM-78H-MBB-V (xxx=440-465, in steps of 5, 156 cells)
JKMxxxM-66H-MBB-V (xxx=370-390, in steps of 5, 132 cells)
JKMxxxM-72HLM-V (xxx=420-465, in steps of 5, 144 cells)
JKMxxxM-60HLM-V (xxx=350-385, in steps of 5, 120 cells)
JKMSxxxM-72H-V-TI; JKMSxxxM-72HL-V-TI; JKMSxxxM-72HB-V-TI; JKMSxxxM-72HBL-V-TI
(xxx=335-425, in steps of 5, 144 cells)
JKMSxxxM-60H-V-TI; JKMSxxxM-60HL-V-TI; JKMSxxxM-60HB-V-TI; JKMSxxxM-60HBL-V-TI
(xxx=270-350, in steps of 5, 120 cells)
JKMSxxxM-72HL-V-TI-Q (xxx=335-425, in steps of 5, 144 cells)
JKMSxxxM-60HL-V-TI-Q (xxx=270-350, in steps of 5, 120 cells)
JKMSxxxM-72H-MBB-V-TI (xxx=385-425, in steps of 5, 144 cells)
JKMSxxxM-60H-MBB-V-TI (xxx=320-355, in steps of 5, 120 cells)
JKMSxxxM-78H-V-TI (xxx=405-465, in steps of 5, 156 cells)
JKMSxxxM-66H-V-TI (xxx=340-390, in steps of 5, 132 cells)
JKMSxxxM-78H-V-TI-Q (xxx=405-465, in steps of 5, 156 cells)
JKMSxxxM-66H-V-TI-Q (xxx=340-390, in steps of 5, 132 cells)
JKMSxxxM-78HB-V-TI (xxx=405-435, in steps of 5, 156 cells)
JKMSxxxM-66HB-V-TI (xxx=340-365, in steps of 5, 132 cells)
JKMSxxxM-7RL3-V-TI (xxx=430-495, in steps of 5, 156 cells)
JKMSxxxM-6RL3-V-TI (xxx=360-415, in steps of 5, 132 cells)
JKMSxxxM-6TL3-V-TI (xxx=335-380, in steps of 5, 120 cells)
JKMSxxxN-72H-MBB-V-TI (xxx=385-425, in steps of 5, 144 cells)
JKMSxxxN-60H-MBB-V-TI (xxx=320-350, in steps of 5, 120 cells)
JKMSxxxM-7RL3-B-V-TI (xxx=425-480, in steps of 5, 156 cells)
JKMSxxxN-7RL3-V-TI (xxx=430-500, in steps of 5, 156 cells)

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JKMSxxxN-6RL3-V-TI (xxx=360-420, in steps of 5, 132 cells)
JKMSxxxN-6TL3-V-TI (xxx=335-380, in steps of 5, 120 cells)
JKMSxxxM-6RL3-B-V-TI (xxx=360-405, in steps of 5, 132 cells)
JKMSxxxN-7RL3-B-V-TI (xxx=425-480, in steps of 5, 156 cells)
JKMSxxxN-6RL3-B-V-TI (xxx=360-405, in steps of 5, 132 cells)
JKMSxxxN-72H-MBB-B-V-TI (xxx=380-400, in steps of 5, 144 cells)
JKMSxxxN-60H-MBB-B-V-TI (xxx=315-330, in steps of 5, 120 cells)
JKMxxxM-72H-V; JKMSxxxM-72HL-V (xxx=335-425, in steps of 5, 144 cells)
JKMxxxM-60H-V; JKMSxxxM-60HL-V (xxx=270-350, in steps of 5, 120 cells)
JKMSxxxM-72H-V-MX3; JKMSxxxM-72HB-V-MX3; JKMSxxxM-72HL-V-MX3; JKMSxxxM-72HBL-V-MX3
(xxx=335-395, in steps of 5, 144 cells)
JKMSxxxM-60H-V-MX3; JKMSxxxM-60HB-V-MX3; JKMSxxxM-60HL-V-MX3; JKMSxxxM-60HBL-V-MX3
(xxx=270-340, in steps of 5, 120 cells)
JKMxxxN-72H-TV; JKMSxxxN-72HL-TV (xxx=375-425, in steps of 5, 144 cells)
JKMxxxN-60H-TV; JKMSxxxN-60HL-TV (xxx=315-355, in steps of 5, 120 cells)
JKMxxxN-72H-MBB-TV (xxx=390-420, in steps of 5, 144 cells)
JKMxxxN-60H-MBB-TV (xxx=330-350, in steps of 5, 120 cells)
JKMxxxM-72H-TV; JKMSxxxM-72HL-TV (xxx=375-425, in steps of 5, 144 cells)
JKMxxxM-60H-TV; JKMSxxxM-60HL-TV (xxx=315-355, in steps of 5, 120 cells)
JKMxxxM-72H-MBB-TV (xxx=385-405, in steps of 5, 144 cells)
JKMxxxM-60H-MBB-TV (xxx=320-335, in steps of 5, 120 cells)
JKMxxxM-72H-MBB-V (xxx=385-425, in steps of 5, 144 cells)
JKMxxxM-60H-MBB-V (xxx=320-355, in steps of 5, 120 cells)
JKSN3-DCCA-xxx (xxx=410-440, in steps of 5, 156 cells)
JKSN3-CCCA-xxx (xxx=345-370, in steps of 5, 132 cells)
JKSM3-DCCA-xxx (xxx=400-425, in steps of 5, 156 cells)
JKSM3-CCCA-xxx (xxx=340-355, in steps of 5, 132 cells)
JKSM3-DACA-xxx (xxx=400-440, in steps of 5, 156 cells)
JKSM3-CACA-xxx (xxx=335-370, in steps of 5, 132 cells)
JKSM3-DCCA-xxx (xxx=430-450, in steps of 5, 156 cells)
JKSM3-CCCA-xxx (xxx=360-380, in steps of 5, 132 cells)
JKMxxxM-78H-V (xxx=405-465, in steps of 5, 156 cells)
JKMxxxM-66H-V (xxx=340-390, in steps of 5, 132 cells)
JKMxxxM-78HB-V (xxx=405-435, in steps of 5, 156 cells)
JKMxxxM-66HB-V (xxx=340-365, in steps of 5, 132 cells)
JKMxxxM-78H-TV (xxx=405-455, in steps of 5, 156 cells)
JKMxxxM-66H-TV (xxx=340-385, in steps of 5, 132 cells)
JKMxxxN-78H-TV (xxx=410-460, in steps of 5, 156 cells)
JKMxxxN-66H-TV (xxx=345-385, in steps of 5, 132 cells)
JKMxxxM-72HB-V; JKMSxxxM-72HBL-V (xxx=335-425, in steps of 5, 144 cells)
JKMxxxM-60HB-V; JKMSxxxM-60HBL-V (xxx=270-350, in steps of 5, 120 cells)
JKMxxxM-78HB-V (xxx=405-435, in steps of 5, 156 cells)
JKMxxxM-66HB-V (xxx=340-365, in steps of 5, 132 cells)
JKMxxxM-78H-TV (xxx=405-455, in steps of 5, 156 cells)
JKMxxxM-66H-TV (xxx=340-385, in steps of 5, 132 cells)
JKMxxxN-78H-TV (xxx=410-460, in steps of 5, 156 cells)
JKMxxxN-66H-TV (xxx=345-385, in steps of 5, 132 cells)

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JKMxxxM-72HB-V; JKMxxxM-72HBL-V (xxx=335-425, in steps of 5, 144 cells)
JKMxxxM-60HB-V; JKMxxxM-60HBL-V (xxx=270-350, in steps of 5, 120 cells)
JKMxxxM-7RL3-V; JKMxxxM-7RL3-V-J (xxx=430-495, in steps of 5, 156 cells)
JKMxxxM-6RL3-V; JKMxxxM-6RL3-V-J (xxx=360-415, in steps of 5, 132 cells)
JKMxxxN-7RL3-V; JKMxxxN-7RL3-V-J (xxx=430-500, in steps of 5, 156 cells)
JKMxxxN-6RL3-V; JKMxxxN-6RL3-V-J (xxx=360-420, in steps of 5, 132 cells)
JKMxxxM-7RL3-TV; JKMxxxM-7RL3-TV-J (xxx=420-475, in steps of 5, 156 cells)
JKMxxxM-6RL3-TV; JKMxxxM-6RL3-TV-J (xxx=355-400, in steps of 5, 132 cells)
JKMxxxN-7RL3-TV; JKMxxxN-7RL3-TV-J (xxx=425-500, in steps of 5, 156 cells)
JKMxxxN-6RL3-TV; JKMxxxN-6RL3-TV-J (xxx=355-420, in steps of 5, 132 cells)
JKMxxxN-72H-MBB-V (xxx=385-425, in steps of 5, 144 cells)
JKMxxxN-60H-MBB-V (xxx=320-350, in steps of 5, 120 cells)
JKMxxxM-72HL-TV-Q (xxx=375-425, in steps of 5, 144 cells)
JKMxxxM-60HL-TV-Q (xxx=315-355, in steps of 5, 120 cells)
JKMxxxM-7RL3-B-V (xxx=425-480, in steps of 5, 156 cells)
JKMxxxM-6RL3-B-V (xxx=360-405, in steps of 5, 132 cells)
JKMxxxN-7RL3-B-V (xxx=425-480, in steps of 5, 156 cells)
JKMxxxN-6RL3-B-V (xxx=360-405, in steps of 5, 132 cells)
JKMxxxN-72H-MBB-B-V (xxx=380-400, in steps of 5, 144 cells)
JKMxxxN-60H-MBB-B-V (xxx=315-330, in steps of 5, 120 cells)
JKMxxxM-72HL-V-Q (xxx=335-425, in steps of 5, 144 cells)
JKMxxxM-60HL-V-Q (xxx=270-350, in steps of 5, 120 cells)
JKMSxxxM-72HL-V-MX3-Q (xxx=335-395, in steps of 5, 144 cells)
JKMSxxxM-60HL-V-MX3-Q (xxx=270-340, in steps of 5, 120 cells)
JKMxxxM-78H-V-Q (xxx=405-465, in steps of 5, 156 cells)
JKMxxxM-66H-V-Q (xxx=340-390, in steps of 5, 132 cells)
JKMxxxM-78H-TV-Q (xxx=405-455, in steps of 5, 156 cells)
JKMxxxM-66H-TV-Q (xxx=340-385, in steps of 5, 132 cells)
JKMxxxN-6TL3-V (xxx=335-380, in steps of 5, 120 cells)
JKMxxxM-6TL3-V (xxx=335-380, in steps of 5, 120 cells)
JKMxxxN-6TL3-TV (xxx=325-380, in steps of 5, 120 cells)
JKMxxxM-6TL3-TV (xxx=325-365, in steps of 5, 120 cells)

With 6" mono c-Si cells:

MMxxx-72LA-MBV, MMxxx-72LA-ABV, SMMxxx-72LA-MBV, SMMxxx-72LA-MBV-TI, SMMxxx-72LA-ABV-TI (xxx=335-410, in steps of 5, 72 cells)
MMxxx-60LA-MBV, MMxxx-60LA-ABV, SMMxxx-60LA-MBV-TI, SMMxxx-60LA-ABV-TI (xxx=270-340, in steps of 5, 60 cells)
SMMxxx-72LA-MBV-MX3, SMMxxx-72LA-ABV-MX3 (xxx=335-395, in steps of 5, 72 cells)
SMMxxx-60LA-MBV-MX3, SMMxxx-60LA-ABV-MX3 (xxx=270-340, in steps of 5, 60 cells)
JKMSxxxM-72-V-TI; JKMSxxxM-72L-V-TI; JKMSxxxM-72B-V-TI; JKMSxxxM-72BL-V-TI (xxx=335-410, in steps of 5, 72 cells)
JKMSxxxM-60-V-TI; JKMSxxxM-60L-V-TI; JKMSxxxM-60B-V-TI; JKMSxxxM-60BL-V-TI (xxx=270-340, in steps of 5, 60 cells)
JKMxxxM-72-V; JKMxxxM-72(Plus)-V; JKMxxxM-72L-V; JKMSxxxM-72-V; JKMSxxxM-72-V-J (xxx=335-410, in steps of 5, 72 cells)

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JKMxxxM-60-V; JKMxxxM-60(Plus)-V; JKMxxxM-60L-V; JKMSxxxM-60-V; JKMSxxxM-60-V-J
(xxx=270-340, in steps of 5, 60 cells)
JKMSxxxM-72-V-MX3; JKMSxxxM-72B-V-MX3; JKMSxxxM-72L-V-MX3; JKMSxxxM-72BL-V-MX3
(xxx=335-395, in steps of 5, 72 cells)
JKMSxxxM-60-V-MX3; JKMSxxxM-60B-V-MX3; JKMSxxxM-60L-V-MX3; JKMSxxxM-60BL-V-MX3
(xxx=270-340, in steps of 5, 60 cells)
JKMxxxM-72B-V; JKMxxxM-72BL-V (xxx=335-410, in steps of 5, 72 cells)
JKMxxxM-60B-V; JKMxxxM-60BL-V (xxx=270-340, in steps of 5, 60 cells)

With 6" poly c-Si cells:

JKMxxxPP-72-V; JKMxxxPP-72(Plus)-V; JKMSxxxPP-72-V; JKMSxxxPP-72-V-J
(xxx=320-355, in steps of 5, 72 cells)
JKMxxxPP-60-V; JKMxxxPP-60(Plus)-V; JKMSxxxPP-60-V; JKMSxxxPP-60-V-J
(xxx=260-290, in steps of 5, 60 cells)
JKMSxxxPP-72-V-MX3; JKMSxxxPP-72B-V-MX3; JKMSxxxPP-72L-V-MX3; JKMSxxxPP-72BL-V-MX3
(xxx=320-355, in steps of 5, 72 cells)
JKMSxxxPP-60-V-MX3; JKMSxxxPP-60B-V-MX3; JKMSxxxPP-60L-V-MX3; JKMSxxxPP-60BL-V-MX3
(xxx=260-290, in steps of 5, 60 cells)
JKMxxxPP-72B-V (xxx=320-355, in steps of 5, 72 cells)
JKMxxxPP-60B-V (xxx=260-290, in steps of 5, 60 cells)

With ½ cut of 6" poly c-Si cells:

JKMxxxPP-72H-V (xxx=330-380, in steps of 5, 144 cells)
JKMxxxPP-60H-V (xxx=260-315, in steps of 5, 120 cells)
JKMSxxxPP-72H-V-MX3; JKMSxxxPP-72HB-V-MX3; JKMSxxxPP-72HL-V-MX3; JKMSxxxPP-72HBL-V-MX3
(xxx=330-380, in steps of 5, 144 cells)
JKMSxxxPP-60H-V-MX3; JKMSxxxPP-60HB-V-MX3; JKMSxxxPP-60HL-V-MX3; JKMSxxxPP-60HBL-V-MX3
(xxx=260-315, in steps of 5, 120 cells)
JKMxxxPP-72HB-V (xxx=330-380, in steps of 5, 144 cells)
JKMxxxPP-60HB-V (xxx=260-315, in steps of 5, 120 cells)

xxx represents output power in Wp

Refer to Constructional Data Form (CDF) No. 50173415 056 for electrical ratings.

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1.2	Product safety ratings	
	The modules are intended for a maximum operating altitude [meters above sea level] of [m]	≤ 2000 m above sea level
	Recommended maximum series/parallel module configurations	Available in installation manual
1.3	Classification, applications and intended use	
	The module has been evaluated for the following Class (IEC 61140):	<input type="checkbox"/> Class 0 <input checked="" type="checkbox"/> Class II <input type="checkbox"/> Class III

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2	<p>Used materials</p> <p>See Constructional Data Form (CDF) No. 50173415 056.</p>		
3	<p>Address(es) of the manufacturing site(s)</p>		
	Factory Address	Inspection report no.	Last FI date
Manufacturing Plant No. 1	Jinko Solar Co., Ltd No.1 Jinko Road, Shangrao Economic Development Zone, Jiangxi, 334100, P. R. China	15033836 014	12/05/2021
Manufacturing Plant No. 2	Zhejiang Jinko Solar Co., Ltd No. 58, Yuan Xi Road, Yuan Hua Town, Haining City, Jiaxing City, Zhejiang 314416, P. R. China	15031265 012	06/07/2021
Manufacturing Plant No. 3	Yuhuan Jinko solar Co., Ltd. At the intersection of Shanghai Road and Taizhou Road in the third issue of Yuhuan economic development Zone, Zhejiang, 317600, P. R. China	50084980 005	14/05/2021
Manufacturing Plant No. 4	Jinko Solar Technology Sdn. Bhd (P6) 2480, Tingkat Perusahaan Enam, Perai Free Trade Zone, 13600 Perai, Penang, Malaysia	50180779 004	16/06/2021
Manufacturing Plant No. 5	Jinko Solar (U.S.) Industries Inc. 4660 POW-MIA MEMORIAL PARKWAY, SUITE 200, JACKSONVILLE, FL 32221 USA	50235972 003	23/03/2021
Manufacturing Plant No. 6	Zhejiang Jinko Solar Co., Ltd. No.35 Haishi Road, Jianshan New District, Haining City, Zhejiang, 314415, P. R. China	15094211 006	12/05/2021
Manufacturing Plant No. 7	HT SOLAR VIETNAM LIMITED COMPANY F3-1 and F3-2 Workshop, Lot F3, Trang Due Industrial Park, a part of Dinh Vu Cat Hai Economic Zone, Hong Phong Commune, An Duong District, Hai Phong City Vietnam	50203380 004	19/11/2021
Manufacturing Plant No. 8	Jiangsu Focus Solar Energy Technology Co., Ltd. No. 66, Lifa Avenue, Development Zone, Hai'an County, Nantong City, Jiangsu, P. R. China	50149208 005	12/03/2021
Manufacturing Plant No. 9	Jinko Solar Technology Sdn. Bhd. No. 1412, Lorong Perusahaan 1, Kawasan Perusahaan Perai, 13600 Perai, Pulau Pinang, Malaysia	CN21SYOW 001	14/09/2021

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Manufacturing Plant No. 10	LDK SOLAR HIGH-TECH (NANCHANG) CO., LTD. No.1699 Tianxiang Road, Hi-Tech industrial Development Zone, Nanchang, Jiangxi, P. R. China	50231446 003	25/03/2021
Manufacturing Plant No. 11	Jinko Solar (Haining) Co., Ltd No. 89, Lianhong Road, Yuanhua town, Haining City, Jiaxi City, Zhejiang, P.R. China	50327614 003	08/11/2021
Manufacturing Plant No. 12	Jinko Solar (Yiwu) Co., Ltd No. 1555, Chengxin Road, Niansanli Street, Yiwu city, Zhejiang, P.R. China	60386490 002	31/05/2021
Manufacturing Plant No. 13	Jinko Solar (Chuzhou) Co., Ltd No.18, Liming Road, Lai'an Economic Development Zone, Chuzhou City, Anhui, 239200, P.R. China	60390755 002	21/06/2021
Manufacturing Plant No. 14	Vina Solar Technology Co., Ltd. Lot CN-03, Factory E12, Van Trung Industry Park, Bac Giang Province, Vietnam	15102480 006	21/10/2021
Manufacturing Plant No. 15	VIET NAM GREEN ENERGY COMMERCIAL SERVICES CO., LTD Lot D1-1, Dai Dong-Hoan Son Industrial Park, Hoan Son Commune, Tien Du District, Bac Ninh Province, Vietnam	60430360 002	30/11/2021
Manufacturing Plant No. 16	Jinko Solar (Shangrao) Co., Ltd. No.1,Yingbin Road, Economic Development Zone, Shangrao City, Jiangxi, 334100, P.R. China	CN212OPK 002	16/11/2021
Manufacturing Plant No. 17	MECEN SOLAR VINA CO., LTD Lot CN2-2 and CN9-4, Yen Phong Industrial Park (expanded area), Yen Trung Commune, Yen Phong District, Bac Ninh Province, Vietnam	IVN211077 001	08/04/2021
Manufacturing Plant No. 18	GREEN WING SOLAR TECHNOLOGY VIET NAM CO., LTD Leasing workshop of Hai Cuong Phat Co., Ltd at Lot CN 5C-4, Que Vo III Industrial Park, Viet Hung Commune, Que Vo District, Bac Ninh Province, Vietnam	P1490408 001	16/04/2021
Manufacturing Plant No. 19	JINKO SOLAR TECHNOLOGY SDN. BHD.(P2) 2522, Lorong Perusahaan 4, Kawasan Perusahaan Bebas Perai, Phase 1, 13600 Perai, Penang Malaysia.	15100723 006	30/06/2021

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Manufacturing Plant No. 20	JINKO SOLAR TECHNOLOGY SDN. BHD.(P3) Lot 10085, Plot C & D, Jalan Perusahaan, Mukim 1, Seberang Perai Tengah, 13600 Perai, Penang, Malaysia.	15101577 005	28/06/2021
Manufacturing Plant No. 21	Jinko Solar Technology Sdn. Bhd (P5) Plot 538 Tingkat Perusahaan 4B, Perai Free Trade Zone, 13600 Perai, Penang, Malaysia	50172713 004	06/07/2021
Manufacturing Plant No. 22	JINKO SOLAR (MALAYSIA) SDN.BHD. Lot 393, Ladang Valdor, Kawasan Perindustrian Valdor, 14100 Sungai Jawi, Pulau Pinang, Malaysia	CN21LVIO 001	18/06/2021

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4	<p>Summary of test results</p> <p>All of the required tests of the standards IEC 61215 / EN 61215 and IEC 61730 / EN 61730 were passed according to its regulations of the pass criteria. It is therefore declared, that the photovoltaic modules of the aforementioned types fulfil the requirements of the standards IEC 61215/EN 61215 and IEC 61730/EN 61730, and it is recommended that declaration letter should be granted.</p> <p>This report includes projects: 244346446, 244353638, 244353799, 244353803, 244353378, 244370126, 244346459, 244347327, 244345685, 244347410, 244347585, 244345736, 244345943, 244345947, 244345728, 244345942, 244345945, 244347586, 244343842, 244347318, 244347697, 244345949, 244347709, 244347939, 244346673, 244346676, 244346456, 244346669, 244346675, 244346392, 244346983, 244347003, 244347057, 244347066, 244347951, 244347949, 244347942, 244346999, 244347005, 244347060.</p> <p>The Static mechanical load test (MQT 16) was performed with design load/safety factor: Positive: 3600Pa/1.5 (downward) Negative: 1600Pa/1.5 (upward) Add installation method (4 Screws on long side) , see table 9.21 for details.</p> <p><i>Description of similarity (differences) between the applied model and the previously tested model.</i> Extension to alternative materials in below table. The relevant tests were performed on representative models and test results are documented in this test report. Part of testing fulfil the requirements of the standards IEC 61215:2021 to cover the requirements of the standards IEC 61215:2016.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Object</th> <th style="width: 20%;">Manufacturer / trademark</th> <th style="width: 20%;">Type / model</th> <th style="width: 15%;">Technical data / ratings</th> <th style="width: 30%;">Representative model for testing</th> </tr> </thead> <tbody> <tr> <td>Front cover</td> <td>Wuxi Haida Solar Co., Ltd.</td> <td>Tempered glass with external AR coating</td> <td>Thickness =3.2mm</td> <td rowspan="2">JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM1)</td> </tr> <tr> <td colspan="4">Remarks: add Wuxi Haida Solar Glass Co., Ltd. as alternative factory for above glass, refer to declaration in appendix E for details.</td> </tr> <tr> <td colspan="5">New combination: Encapsulation material F406P/ F806+ Rear cover BEC-301D.</td> </tr> <tr> <td>Front cover</td> <td>RSD SOLAR TECHNOLOGY Co.,LTD</td> <td>Tempered glass with external AR coating</td> <td>Thickness =3.2mm</td> <td rowspan="2">JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM2)</td> </tr> <tr> <td colspan="5">New combination: Encapsulation material F406P/F806W + Rear cover BEC-301D.</td> </tr> <tr> <td>Rear cover</td> <td>Jolywood (Suzhou) Sunwatt Co., Ltd.</td> <td>FFC-JW3010(plus)</td> <td>Thickness =0.310 mm</td> <td rowspan="2">JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM3)</td> </tr> <tr> <td colspan="5">New combination: Encapsulation material S201MT1/G401W + Rear cover FFC-JW3010(plus).</td> </tr> <tr> <td colspan="5">New combination: Encapsulation material F406P/F806+ Rear cover FFC-JW3010(plus).</td> </tr> <tr> <td>Frame</td> <td>Jiangsu Caesar Profile Tecnology</td> <td>Steel (Black/Silver/Silvery)</td> <td>Thickness= 30mm</td> <td>JKM580M-78HL4-TV</td> </tr> </tbody> </table>				Object	Manufacturer / trademark	Type / model	Technical data / ratings	Representative model for testing	Front cover	Wuxi Haida Solar Co., Ltd.	Tempered glass with external AR coating	Thickness =3.2mm	JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM1)	Remarks: add Wuxi Haida Solar Glass Co., Ltd. as alternative factory for above glass, refer to declaration in appendix E for details.				New combination: Encapsulation material F406P/ F806+ Rear cover BEC-301D.					Front cover	RSD SOLAR TECHNOLOGY Co.,LTD	Tempered glass with external AR coating	Thickness =3.2mm	JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM2)	New combination: Encapsulation material F406P/F806W + Rear cover BEC-301D.					Rear cover	Jolywood (Suzhou) Sunwatt Co., Ltd.	FFC-JW3010(plus)	Thickness =0.310 mm	JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM3)	New combination: Encapsulation material S201MT1/G401W + Rear cover FFC-JW3010(plus).					New combination: Encapsulation material F406P/F806+ Rear cover FFC-JW3010(plus).					Frame	Jiangsu Caesar Profile Tecnology	Steel (Black/Silver/Silvery)	Thickness= 30mm	JKM580M-78HL4-TV
Object	Manufacturer / trademark	Type / model	Technical data / ratings	Representative model for testing																																																	
Front cover	Wuxi Haida Solar Co., Ltd.	Tempered glass with external AR coating	Thickness =3.2mm	JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM1)																																																	
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Rear cover	Jolywood (Suzhou) Sunwatt Co., Ltd.	FFC-JW3010(plus)	Thickness =0.310 mm	JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM3)																																																	
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Frame	Jiangsu Caesar Profile Tecnology	Steel (Black/Silver/Silvery)	Thickness= 30mm	JKM580M-78HL4-TV																																																	

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	Co.,Ltd Jinko Solar Co., Ltd. (brand holder)	Gray)		(Median power) (BOM5)	
Remarks: add this 30mm frame for below module types. JKMxxxM-72HLM-V,MMxxx-72HLM-MBV,JKMxxxM-78HL4-V,JKMxxxM-72HL4-V, JKMxxxM-66HL4-V,MMxxx-78HLD-MBV,MMxxx-72HLD-MBV,MMxxx-66HLD- MBV, JKMxxxM-78HL4-TV,JKMxxxM-72HL4-TV,JKMxxxM-66HL4-TV,JKMxxxM- 7RL4-V, JKMxxxM-7TL4-V,JKMxxxM-6RL4-V,MMxxx-7RLD-MBV,MMxxx-7TLD- MBV, MMxxx-6RLD-MBV,JKMxxxM-7RL4-TV,JKMxxxM-7TL4-TV,JKMxxxM-6RL4- TV,JKMxxxN-78HL4-V,JKMxxxN-72HL4-V,JKMxxxN-66HL4-V,JKMxxxN-72HL4- TV,JKMxxxN-66HL4-TV,JKMxxxN-7RL4-V,JKMxxxN-7TL4-V,JKMxxxN-6RL4- V,JKMxxxN-7RL4-TV, JKMxxxN-7TL4-TV,JKMxxxN-6RL4-TV,JKMxxxM-72HL4-B- V,JKMxxxM-66HL4-B-V, JKMxxxN-72HL4-B-V,JKMxxxN-66HL4-B-V,JKMxxxM- 7RL4-B-V,JKMxxxM-7TL4-B-V, JKMxxxM-6RL4-B-V,JKMxxxN-7RL4-B- V,JKMxxxN-7TL4-B-V,JKMxxxN-6RL4-B-V, JKMxxxM-72HLM-TV,JKMxxxM- 72HLM-B-V,JKxxxM-66R5-MWV,JKxxxM-66R5-BTV, JKxxxM-66H5-MWV,JKxxxM- 66H5-BTV					
Encapsulation material	Changzhou Betterial Film Technologies Co., Ltd.	B601HP (contact with glass)+ B602MP (contact with rear cover)	B601HP, Thickness=0.40mm B602MP, Thickness=0.40mm	Refer to test report No. CN22J4GS 001.	
Remarks: this encapsulation material can be used with rear cover ETT15C-TM and solar cell 182M 247 MBB SAJ-BCPU.					
Fixing Tape	Luqin New Material Technology (Jiangsu) Co., Ltd.	D60F6-2	Thickness=0.063±0 .002mm		
New combination: Encapsulation material B601HP/B602MP+ Fluxing agent SF105.					
New combination: Encapsulation material B601HP/B602MP+ Fixing Tape D60F6-2					
New combination: Rear cover Cynagard 225A(R)(E) +Encapsulation material T11/W11.					
New combination: Encapsulation material T11/ W11+Fluxing agent SF105.					
New combination: Encapsulation material T11/ W11+ Fixing Tape D60F6-2.					
New combination: Encapsulation material EVA9110T/EVA9120B + Fluxing agent SF105.					
New combination: Encapsulation material EVA9110T/EVA9120B + Fixing Tape D60F6-2.					
New combination: Rear cover ETT15C(JKBS5B0101 for jinko brand) + Encapsulation material EVA9110T/EVA9120B					
New combination: Encapsulation material S201MT1/S201MT2+ Fluxing agent SF105.					
New combination: Encapsulation material S201MT1/S201MT2+ Fixing Tape HZ UV-1.					
New combination: Encapsulation material S201MT1/S201MT2+Rear cover KPCw1					
New combination: Encapsulation material D5008-2P/D5008-3P + Fluxing agent SF105					
Refer to test report No. CN22P7W0 001					
Refer to test report No.					

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New combination: Encapsulation material D5008-2P/D5008-3P + Fixing Tape 9966				CN22ZSY6 001
New combination: Encapsulation material D5008-2P/D5008-3P+Rear cover KPCw1				
Encapsulation material	SHANGHAI TIANYANG HOT MELT ADHESIVES CO., LTD.	JCC-105P-T(contact with glass)+ JCC-105P(contact with rear cover)	JCC-105P-T, Thickness=0.40mm JCC-105P, Thickness=0.40mm	Refer to test report No. CN2251D0 001
Remarks: this encapsulation material can be used with solar cell 182M 247 MBB SAJ-BCPU.				
New combination: Encapsulation material JCC-105P-T/JCC-105P +Rear cover ETT15C(JKBS5B0101 for jinko brand).				
New combination: Encapsulation material JCC-105P-T/JCC-105P + Fixing Tape D60F6-2.				
New combination: Encapsulation material JCC-105P-T/JCC-105P + Fluxing agent SF105.				
Encapsulation material	Jiangsu Lushan New Materials Co. Ltd	EV1050G2(contact with glass)+EV1050G5(contact with rear cover)	EV1050G2 Thickness=0.40mm EV1050G5 Thickness=0.40mm	
Remarks: this encapsulation material can be used with solar cell 182M 247 MBB SAJ-BCPU.				
New combination: Encapsulation material EV1050G2/EV1050G5 + Fluxing agent SF105.				
New combination: Encapsulation material EV1050G2/EV1050G5 + Fixing Tape D60F6-2.				
New combination: Encapsulation material EV1050G2/EV1050G5 + Rear cover ETT15C(JKBS5B0101 for jinko brand).				
Encapsulation material	SHANGHAI TIANYANG HOT MELT ADHESIVES CO., LTD.	JCC-105P-T(contact with glass)+ JCC-105W(contact with rear cover)	JCC-105P-T, Thickness=0.40mm JCC-105W, Thickness=0.40mm	Refer to test report No. CN22FRNE 001
Remarks: this encapsulation material can be used with solar cell 182M 247 MBB SAJ-BCPU.				
New combination: Encapsulation material JCC-105P-T/JCC-105W + Rear cover ETT15C(JKBS5B0101 for jinko brand).				
New combination: Encapsulation material JCC-105P-T/JCC-105W + Fixing Tape D60F6-2.				
New combination: Encapsulation material JCC-105P-T/JCC-105W + Fluxing agent SF105.				
Encapsulation material	Changzhou Betterial Film Technologies Co., Ltd.	B601HP (contact with glass)+ B601W (contact with rear cover)	B601HP, Thickness=0.40mm B601W, Thickness=0.40mm	
Remarks: this encapsulation material can be used with solar cell 182M 247 MBB SAJ-BCPU.				

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New combination: Encapsulation material B601HP/B601W +Rear cover ETT15C(JKBS5B0101 for jinko brand).				
New combination: Encapsulation material B601HP/B601W +Fluxing agent SF105.				
New combination: Encapsulation material B601HP/B601W+Fixing Tape D60F6-2.				
Encapsulation material	Zhejiang Sinopont Technology Co., Ltd.	EVA9110T (contact with glass)+7100 (contact with rear cover)	EVA9110T, Thickness=0.40mm 7100, Thickness=0.40mm	Refer to test report No. CN2276JE 001
Remarks: this encapsulation material can be used with solar cell 182M 247 MBB SAJ-BCPU.				
New combination: Encapsulation material EVA9110T/7100+Rear cover ETT15C(JKBS5B0101 for jinko brand).				
New combination: Encapsulation material EVA9110T/7100+Fluxing agent SF105.				
New combination: Encapsulation material EVA9110T/7100+Fixing Tape D60F6-2.				
Rear cover	Chang Zhou Hui Tian New Material Co., Ltd	PV321C	Thickness=0.314 mm	Refer to test report No. CN22P82Y 001
Remarks: this rear cover can be used with encapsulation material F406P/F806W.				
New combination: Encapsulation material F406P/F806W+ Fixing Tape D60F6-2.				
New combination: Encapsulation material F406P/F806W +Fluxing agent TFHF9200.				
Rear cover	Suzhou First PV Material CO., LTD.	BEC-303	Thickness =0.305 mm	Refer to test report No. CN220IOR 001
Remarks: this rear cover can be used with encapsulation material F406P/ F806.				
New combination: Encapsulation material F406P/ F806+ Fixing Tape D60F6-2.				
New combination: Encapsulation material S201MT1/S201MT2 +Rear cover ETK15C.				Refer to test report No. CN22YK39 001
New combination: Encapsulation material S201MT1/S201MT2 + Fixing Tape D60F6-2.				
New combination: Encapsulation material S201MT1/G401W+Fixing Tape D60F6-2.				Refer to test report No. CN22589M 001
New combination: Encapsulation material S201MT1/G401W+Rear cover PV331C.				
New combination: Encapsulation material SV-15296P/SV-15297W +Fixing Tape D60F6-2.				Refer to test report No. CN22K5WE 001
New combination: Encapsulation material SV-15296P/SV-15297W +Rear cover ETT15C(JKBS5B0101 for jinko brand).				
New combination: Encapsulation material D5008-2P/D5008-3P+Fixing Tape D60F6-2.				Refer to test report No. CN22PTK8 001
New combination: Encapsulation material D5008-2P/D5008-3P+ Rear cover ETT15C(JKBS5B0101 for jinko brand).				
New combination: Encapsulation material SV-15296P/SV-15297P+Fixing Tape D60F6-2.				Refer to test report No. CN22BHO8 001
New combination: Encapsulation material SV-15296P /SV-15297P+Rear cover				

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ETT15C(JKBS5B0101 for jinko brand).				
New combination: Encapsulation material EVA9110T/ PO8510 +Fixing Tape D60F6-2.				Refer to test report No. CN227ZNV 001
Rear cover	Chang Zhou Hui Tian New Material Co., Ltd	PV331C	Thickness =0.316 mm	Refer to test report No. CN223CPT 001
New combination: Encapsulation material F406P/ F806+ Rear cover PV331C.				
Fluxing agent	Shenzhen Tongfang Electronic New Material Co., Ltd.	TFHF9200	-	
New combination: Encapsulation material F406P/ F806+ Fluxing agent TFHF9200.				
New combination: Encapsulation material F406P/ F806+ Solar cell M182 10BB.				Refer to test report No. CN22K2L4 001
New combination: Encapsulation material F406P/ F806W + Rear cover PV331C.				
New combination: Encapsulation material F406P/ F806W + Fixing Tape UV-100.				
Rear cover	Chang Zhou Hui Tian New Material Co., Ltd	PV321C	Thickness =0.314 mm	Refer to test report No. CN22RYVD 001
New combination: Encapsulation material F406P/ F806+ Rear cover PV321C.				Refer to test report No. CN22FLSB 001
New combination: Encapsulation material S201MT1/ S201MT2+ Fixing Tape FF-3665.				
New combination: Encapsulation material S201MT1/ S201MT2+ Rear cover PV321C.				
New combination: Encapsulation material S201MT1/G401W+ Fluxing agent TFHF9200.				
New combination: Encapsulation material S201MT1/G401W + Rear cover ETK15C.				Refer to test report No. CN22NCKA 001
New combination: Encapsulation material F406P/ F806 + Rear cover ETK15C.				Refer to test report No. CN224LHU 001
Rear cover	Ningbo Exciton New Energy Co., Ltd.	ETK15C	Thickness=0.315m m	Refer to test report No. CN229F9H 001
New combination: Encapsulation material F406P/ F806W + Rear cover ETK15C.				
Fluxing agent	Jiangsu Chenrui Metal Material Co., Ltd.	CR-PV201	-	
New combination: Encapsulation material F406P/ F806W + Fluxing agent CR-PV201.				Refer to test report No. CN22CQR0 001
New combination: Encapsulation material F406P/ F806W + Rear cover YK-TC280.				
Rear cover	Shaoxing Lianji New Materials Technology Co.,	YK-TC280	Thickness =0.323mm	Refer to test report No.

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	Ltd.			CN22PJ6U 001
New combination: Encapsulation material F406P/ F806 + Rear cover YK-TC280.				
Rear cover	Suzhou Yisheng optical material Co., Ltd	InshineT01H	Thickness =0.312 mm	Refer to test report No. CN22HC9N 001
New combination: Encapsulation material F406P/ F806 + Rear cover InshineT01H.				
New combination: Encapsulation material S201MT1/ G401W + Rear cover InshineT01H.				
New combination: Encapsulation material F406P/ F806 + Rear cover BEC-306D.				
Rear cover	Suzhou First PV Material CO., LTD.	BEC-303	Thickness =0.305 mm	Refer to test report No. CN22RB25 001
New combination: Encapsulation material F406P/ F806W + Rear cover BEC-303.				
Encapsulation material	Cybrid Technology Inc.	T11(contact with glass)+W11(contact with rear cover)	T11, Thickness=0.40mm W11, Thickness=0.40mm	Refer to test report No. CN22ZIAF 001 and CN22AW8M 001.
New combination: Encapsulation material T11/ W11+ Rear cover ETT15C(JKBS5B0101 for jinko brand).				
New combination: Encapsulation material T11/ W11+Fixing tape 9966.				
New combination: Encapsulation material T11/ W11+ Solar cell 182M 247 MBB SAJ-BCPU.				
New combination: Encapsulation material F406P/F806W + Rear cover KPCw1.				
New combination: Encapsulation material EVA9110T/EVA9120B +Rear cover KPCw1.				
New combination: Encapsulation material EVA9110T/EVA9120B+Fixing tape 9966.				
New combination: Encapsulation material S201MT1 / S201MT2+Rear cover ETT15C(JKBS5B0101 for jinko brand)				
New combination: Encapsulation material S201MT1 / S201MT2 +Fixing tape 9966.				

Extension to alternative materials and combinations in below table. No additional testing is considered necessary for the following modifications.

Object	Manufacturer / trademark	Type / model	Technical data / ratings	Description
Encapsulation material	Changzhou Betterial Film Technologies Co., Ltd.	B601HP (contact with glass)+ B602MP (contact with rear cover)	B601HP, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm B602MP, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.8	Extension to alternative thickness as listed on the left. The lamination process is the same as approved thickness 0.4mm in this report. Refer to declaration in

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			0mm	appendix E for details.
Encapsulation material	SHANGHAI TIANYANG HOT MELT ADHESIVES CO., LTD.	JCC-105P-T (contact with glass)+ JCC-105P(contact with rear cover)	JCC-105P-T, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm JCC-105P, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm	Extension to alternative thickness as listed on the left. The lamination process is the same as approved thickness 0.4mm in this report. Refer to declaration in appendix E for details.
Encapsulation material	Jiangsu Lushan New Materials Co., Ltd	EV1050G2 (contact with glass)+EV1050G5(contact with rear cover)	EV1050G2 Thickness =0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm EV1050G5 Thickness =0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm	Extension to alternative thickness as listed on the left. The lamination process is the same as approved thickness 0.4mm in this report. Refer to declaration in appendix E for details.
Encapsulation material	SHANGHAI TIANYANG HOT MELT ADHESIVES CO., LTD.	JCC-105P-T(contact with glass)+ JCC-105W(contact with rear cover)	JCC-105P-T, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm JCC-105W, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm	Extension to alternative thickness as listed on the left. The lamination process is the same as approved thickness 0.4mm in this report. Refer to declaration in appendix E for details.
Encapsulation material	Changzhou Betterial Film Technologies Co., Ltd.	B601HP (contact with glass)+ B601W (contact with rear cover)	B601HP, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm B601W, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm	Extension to alternative thickness as listed on the left. The lamination process is the same as approved thickness 0.4mm in this report. Refer to declaration in appendix E for details.
Encapsulation material	Zhejiang Sinopont Technology Co., Ltd.	EVA9110T (contact with glass)+7100 (contact with rear cover)	EVA9110T, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm 7100, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm	Extension to alternative thickness as listed on the left. The lamination process is the same as approved thickness 0.4mm in this report. Refer to declaration in appendix E for details.
Encapsulation material	Cybrid Technology Inc.	T11(contact with glass)+W11(contact with rear cover)	T11, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm W11, Thickness=0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm	Extension to alternative thickness as listed on the left. The lamination process is the same as approved thickness 0.4mm in this report. Refer to declaration in appendix E for details.
New combination: Encapsulation material 8110/8510+ Rear cover ETT15C-T				Based on approved combination

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	encapsulation material 9110T/8510+ rear cover ETT15C-T in test report No. CN227ZNV 001. 8510 is contact with rear cover.
New combination: Encapsulation material 8110/8510+ Rear cover ETT15C-TM	Based on approved combination encapsulation material 9110T/8510+ rear cover ETT15C-TM in test report No. CN227ZNV 001. 8510 is contact with rear cover.
New combination: Encapsulation material TF4/ F806+ Rear cover PV331C	Based on approved combination encapsulation material F406P/F806+ rear cover PV331C in test report No. CN223CPT 001. F806 is contact with rear cover.
New combination: Encapsulation material TF4/ F806W + Rear cover PV331C	Based on approved combination encapsulation material F406P/ F806W + rear cover PV331C in test report No. CN22K2L4 001. F806W is contact with rear cover.
New combination: Encapsulation material TF4/ F806+ Rear cover PV321C	Based on approved combination encapsulation material F406P/F806+ rear cover PV321C in test report No. CN22RYVD 001. F806 is contact with rear cover.
New combination: Encapsulation material TF4/ F806W + Rear cover PV321C	Based on approved combination encapsulation material F406P/ F806W + rear cover PV321C in test report No. CN22P82Y 001. F806W is contact with rear cover.
New combination: Encapsulation material TF4/ F806+ Rear cover ETK15C	Based on approved combination

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	encapsulation material F406P/F806+ rear cover ETK15C in test report No. CN224LHU 001. F806 is contact with rear cover.
New combination: Encapsulation material TF4/ F806W + Rear cover ETK15C	Based on approved combination encapsulation material F406P/ F806W + rear cover ETK15C in test report No. CN229F9H 001. F806W is contact with rear cover.
New combination: Encapsulation material TF4/ F806+ Rear cover YK-TC280	Based on approved combination encapsulation material F406P/F806+ rear cover YK-TC280 in test report No. CN22PJ6U 001. F806 is contact with rear cover.
New combination: Encapsulation material TF4/ F806W + Rear cover YK-TC280	Based on approved combination encapsulation material F406P/ F806W + rear cover YK-TC280 in test report No. CN22CQR0 001. F806W is contact with rear cover.
New combination: Encapsulation material TF4/ F806+ Rear cover InshineT01H	Based on approved combination encapsulation material F406P/ F806 + rear cover InshineT01H in test report No. CN22HC9N 001. F806 is contact with rear cover.
New combination: Encapsulation material TF4/ F806+ Rear cover BEC-303	Based on approved combination encapsulation material F406P/F806+ rear cover BEC-303 in test report No. CN220IOR 001. F806 is contact with rear cover.
New combination: Encapsulation material TF4/ F806W + Rear cover BEC-303	Based on approved combination

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Produktbeschreibung
Product description

	encapsulation material F406P/ F806W + rear cover BEC-303 in test report No. CN22VYBC 001. F806W is contact with rear cover.
New combination: Encapsulation material TF4/ F806+ Rear cover BEC-306D	Based on approved combination encapsulation material F406P/F806+ rear cover BEC-306D in test report No. CN22RB25 001. F806 is contact with rear cover.
New combination: Encapsulation material TF4/ F806W + Rear cover BEC-306D	Based on approved combination encapsulation material F406P/ F806W + rear cover BEC-306D in test report No. 50173415 043 and 50173415 046. F806W is contact with rear cover.
New combination: Encapsulation material TF4/ F806+ Rear cover KPCw1	Based on approved combination encapsulation material F406P/F806+ rear cover KPCw1 in test report No. 50173415 036. F806 is contact with rear cover.
New combination: Encapsulation material TF4/ F806W + Rear cover KPCw1	Based on approved combination encapsulation material F406P/ F806W + rear cover KPCw1 in test report No. CN22BTWN 001. F806W is contact with rear cover.
New combination: Encapsulation material TF4/ F806+ Rear cover BEC-301D	Based on approved combination encapsulation material F406P/F806+ rear cover BEC-301D (BOM1) in this report. F806 is contact with rear cover.
New combination: Encapsulation material TF4/ F806W + Rear cover BEC-301D	Based on approved combination

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Produktbeschreibung
Product description

				encapsulation material F406P/ F806W + rear cover BEC-301D (BOM2) in this report. F806W is contact with rear cover.
New combination: Encapsulation material TF4/ F806 + Rear cover FFC-JW3010(plus)				Based on approved combination encapsulation material F406P/F806+ rear cover FFC-JW3010(plus) (BOM4) in this report. F806 is contact with rear cover.
New combination: Encapsulation material SE-556/ SV-15297W + Rear cover ETT15C (JKBS5B0101 for Jinko brand)				Based on approved combination encapsulation material SV-15296P/ SV-15297W + rear cover ETT15C in test report No. CN22K5WE 001. SV-15297W is contact with rear cover.
New combination: Encapsulation material SE-556/ SV-15297P + Rear cover ETT15C (JKBS5B0101 for Jinko brand)				Based on approved combination encapsulation material SV-15296P / SV-15297P + rear cover ETT15C in test report No. CN22BHO8 001. SV-15297P is contact with rear cover.
Front cover	Wuxi Haida Solar Co., Ltd.	Tempered glass with external AR coating	Thickness =4.0mm	Based on approved thickness 3.2mm in JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM1).
Front cover	RSD SOLAR TECHNOLOGY Co.,LTD	Tempered glass with external AR coating	Thickness =4.0mm	Based on approved thickness 3.2mm in JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM2).
String connectors	Xi'an Telison New Materials Co., Ltd. Jinko Solar Co., Ltd. (brand holder)	Sn60%Pb40%	0.35mm x 4.0mm 0.35mm x 6.0mm	Based on approved dimension 0.4mmx4.0mm and 0.3mmx4.0mm in test report No. 50173415 034 and 0.35mm x 4.0mm and 0.35mm x 6.0mm from Suzhou YourBest New

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Product description

			Materials Co., Ltd in test report No. 50173415 032.
Add Jinko Solar Co., Ltd. as brand holder and add alternative name for below approved frame adhesive, refer to declaration in appendix E for details.			
Previous name		Alternative name	N/A
MH-3668		JKGJ0001	N/A
Add Jinko Solar Co., Ltd. as brand holder for below approved frame, refer to declaration in appendix E for details.			
Object	Manufacturer / trademark	Type / model	Description
Front cover	Changzhou Almaden Stock Co., Ltd	Tempered glass with external AR coating	Thickness =3.2 / 4.0mm
Update materials for below junction boxes, which have been certified according to standard IEC 62790: 2014 including cables, connectors, bypass diodes, potting materials and junction box adhesives matching with backsheets of module.			
Object	Manufacturer / trademark	Type / model	Description
Junction box	Jiangxi Jinko PV Material Co., Ltd. Jinko PV Material Supply Sdn. Bhd.	PV-JK09ESxy (x=N1 or N2 or W1 or W2, y=1 or 2 or 3 or 4)	Certificate R 50525963 CDF No.CN2197SH 001
		PV-JK09Lxy (x=1 or 2, y=1 or 2 or 3 or 4)	Certificate R 50354415 CDF No. 5101180 034
		PV-JK09Exy (x= M or M2 or L, y=1 or 2)	
This report have to be read in conjunction with report 50173415 001-012, 014, 016-018, 021-026, 029, 032, 034, 036, 037, 040, 043, 044, 046, 048, 049, 051, 053 and 054. Constructional Data Form (CDF) No. 50173415 056.			
This test report includes a history of reporting and certification, measurement reports, photo documentation and declarations in the appendix.			
Throughout this report a point is used as the decimal separator.			
<i>Summary of test locations:</i>			
All tests were tested at TÜV Rheinland (Shanghai) Co., Ltd			
Fire test (MST 23) was performed at Leading Edge Construction Materials Testing Company Limited.			

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5	Test specification		
	IEC 61215-1:2016; EN 61215-1:2016: Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1: Test requirements	applicable	
	IEC 61215-1-1:2016; EN 61215-1-1:2016: Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules	applicable	
	IEC 61215-2:2016; EN 61215-2:2017: Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures	applicable	—
	IEC 61730-1:2016; EN IEC 61730-1:2018: Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction	applicable	
	IEC 61730-2:2016; EN IEC 61730-2:2018: Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing	applicable	
	2 PfG 2645/11.18: Supplementary Power Rating of Bifacial Photovoltaic (PV) Modules	applicable	
	2 PfG 2665/06.18: Additional Testing Requirements of Bifacial Photovoltaic (PV) Modules	applicable	

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6	List of test samples		
<input type="checkbox"/> The modules tested were taken at random from a production batch and subjected to manufacturer's normal quality control and inspection for safety testing			
<input checked="" type="checkbox"/> The modules tested were prototypes of a new design and not taken from a production batch.			
Module type: JKM550M-72HL4-V (Median power) (BOM1)			
Sample no.	Sample SN	Test sequence	Remarks / constructional characteristics (e.g. cell, backsheet, frame type)
1-1	63xx2021081911 0536430001	A2	Front cover: 3.2mm tempered glass with external AR coating from WU XI HAIDA SAFETY GLASS CO., LTD. Rear cover: 0.300mm BEC-301D from Suzhou First PV Material CO., LTD. Encapsulation material: 0.40mm F406P/0.40mm F806 from Hangzhou First PV Material Co., Ltd. Frame: 35mm 6005T5 from Henan Hengmei Aluminum Co., Ltd. Adhesive (frame): HT906Z from Shanghai Huitian New Material Co., Ltd. Solar Cell: 182mmx182mmx140± 14µm, 182M 247 MBB SAJ-BCPU from Jinko Solar Co., Ltd. Cell connectors: Φ0.35mm Sn60%Pb40% from Suzhou YourBest New Materials Co., Ltd. String connectors: 0.4mm x 4.0mm Sn60%Pb40% from Suzhou YourBest New Materials Co., Ltd. Fluxing agent: SF105 from Asahi Fixing Tape: 0.063±0.002mm D60F6-2 from Luqin New Material Technology (Jiangsu), Co., Ltd. Insulation tape: Junction box: PV-JK09Lxy (x=2, y=1) from Jiangxi Jinko PV Material Co., Ltd. Cable: 62930 IEC 131 1X2,5...10mm ² from Jiangxi Jinko PV Material Co., Ltd. Connector: PV-JK03M2/xy (Plug+Socket)(x=2,y= A or B or C or D) from Jiangxi Jinko PV Co.,Ltd Bypass Diode: TPA4050-T (3 pcs) from Jiangxi Jinko PV Material Co., Ltd. Potting material: 5299W-S from Shanghai Huitian New Material Co., Ltd. Adhesive (Junction Box): HT906Z from Shanghai Huitian New Material Co., Ltd.
1-2	63xx2021081911 0536430002	B2	
1-3	63xx20210819110 536430009	C1	
1-4	63xx20210819110 536430010	C2	
1-5	63xx2021081911 0536430007	M	
1-6	63xx2021081911 0536430003	I	
1-7*	63xx2021081911 0536430008	H	
1-8	63xx2021081911 0536430006	F+G1	
1-9	63xx2021081911 0536430004	G+ MST 04	
1-10	63xx2021081911 0536430016	MST 23	
1-11	63xx2021081911 0536430017	MST 23	
Module type: JKM570M-7RL4-V (Median power) (BOM1)			
1-12	82XX20210819110 536440001	E1	Same as above

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1-13	82XX20210819110 536440002	E2		
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Supplementary information:

*Sample No. 1-7 is frameless module for Impulse voltage test (MST 14).

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6	List of test samples			
<input type="checkbox"/> The modules tested were taken at random from a production batch and subjected to manufacturer's normal quality control and inspection for safety testing				
<input checked="" type="checkbox"/> The modules tested were prototypes of a new design and not taken from a production batch.				
Module type: JKM550M-72HL4-V (Median power) (BOM2)				
Sample no.	Sample SN	Test sequence	Remarks / constructional characteristics (e.g. cell, backsheet, frame type)	N/A
2-1	63xx2021081911 0536420008	A2	Front cover: 3.2mm tempered glass with external AR coating from RSD SOLAR TECHNOLOGY Co., LTD Rear cover: 0.300mm BEC-301D from Suzhou First PV Material CO., LTD.	
2-2	63xx2021081911 0536420009	C1	Encapsulation material: 0.40mm F406P/0.40mm F806W from Hangzhou First PV Material Co., Ltd. Frame: 35mm 6005T5 from Henan Hengmei Aluminum Co., Ltd.	
2-3	63xx2021081911 0536420010	C2	Adhesive (frame): JS-606 from Hangzhou Zhijiang silicone chemicals co.,Ltd Solar Cell: 182M 247 MBB SAJ-BCPU 182mmx182mm x140± 14µm from Jinko Solar Co., Ltd.	
2-4	63xx2021081911 0536420007	M	Cell connectors: 0.4mm x 4.0mm Sn60%Pb40% from Suzhou YourBest New Materials Co., Ltd. String connectors: Φ0.35mm Sn60%Pb40% from Suzhou YourBest New Materials Co., Ltd. Fluxing agent: 8000T20 from Shenzhen Huaihui Electronic Material Co., Ltd	
2-5*	63xx2021081911 0536420001	H	Fixing Tape: 0.063±0.002mm D60F6-2 from Luqin New Material Technology (Jiangsu) Co., Ltd. Junction box: PV-JK09Lxy (x=2, y=1) from Jiangxi Jinko PV Material Co., Ltd.	
2-6	63xx2021081911 0536420006	F+G1	Cable: 62930 IEC 131 1X2,5...10mm ² from Jiangxi Jinko PV Material Co., Ltd. Connector: PV-JK03M2/xy (Plug+Socket)(x=2,y= A or B or C or D) from Jiangxi Jinko PV Co., Ltd Bypass Diode: TPA4050-T (3 pcs) from Jiangxi Jinko PV Material Co., Ltd.	
2-7	63xx2021081911 0536420002	G+ MST 04	Potting material: JS-1184 from Hangzhou Zhijiang silicone chemicals Co., Ltd Adhesive (Junction box): JS-606from Hangzhou Zhijiang silicone chemicals co.ltd	
Module type: JKM570M-7RL4-V (Median power) (BOM2)				
2-8	82XX202108191 10536440004	E1	Same as above	

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2-9	82XX202108191 10536440005	E2		
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Supplementary information:

*Sample No. 2-5 is frameless module for Impulse voltage test (MST 14).

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6	List of test samples		
<input type="checkbox"/> The modules tested were taken at random from a production batch and subjected to manufacturer's normal quality control and inspection for safety testing			
<input checked="" type="checkbox"/> The modules tested were prototypes of a new design and not taken from a production batch.			
Module type: JKM550M-72HL4-V (Median power) (BOM3)			
Sample no.	Sample SN	Test sequence	Remarks / constructional characteristics (e.g. cell, backsheet, frame type)
3-1	63xx2021081911 0536400002	A2	Front cover: 3.2mm tempered glass with external AR coating from WU XI HAIDA SAFETY GLASS CO., LTD.
3-2	63xx2021081911 0536400004	B2	Rear cover: 0.310mm FFC-JW3010(plus) from Jolywood (Suzhou) Sunwatt Co., Ltd. Encapsulation material: 0.40mm S201MT1/0.40mm G401W from Shanghai HIUV New Materials Co., Ltd.
3-3	63xx2021081911 0536400008	E1	Frame: 35mm 6005T5 from Henan Hengmei Aluminum Co., Ltd.
3-4	63xx2021081911 0536400009	E2	Adhesive (frame): HT906Z from Shanghai Huitian New Material Co., Ltd
3-5	63xx2021081911 0536400005	I	Solar Cell: 182mmx182mmx140± 14µm, 182M 247 MBB SAJ-BCPU from Jinko Solar Co., Ltd.
3-6*	63xx2021081911 0536400003	H	Cell connectors: Φ0.35mm Sn60%Pb40% from Suzhou YourBest New Materials Co., Ltd. String connectors: 0.4mm x 4.0mm Sn60%Pb40% from Suzhou YourBest New Materials Co., Ltd.
3-7	63xx2021081911 0536400007	F+G1	Fluxing agent: SF105 from Asahi Fixing Tape: 0.085mm 9966 from Shanghai Hyperion Adhesive Material Co., Ltd
3-8	63xx2021081911 0536400006	G	Junction box: PV-JK09Lxy (x=2, y=1) from Jiangxi Jinko PV Material Co., Ltd. Cable: 62930 IEC 131 1X2,5...10mm ² from Jiangxi Jinko PV Material Co., Ltd.
3-9	63xx2021081911 0536400018	MST 23	Connector: PV-JK03M2/xy (Plug+Socket)(x=2,y= A or B or C or D) from Jiangxi Jinko PV Co.,Ltd Bypass Diode: TPA4050-T (3 pcs) from Jiangxi Jinko PV Material Co., Ltd.
3-10	63xx2021081911 0536400019	MST 23	Potting material: 5299W-S from Shanghai Huitian New Material Co., Ltd. Adhesive (Junction Box): HT906Z from Shanghai Huitian New Material Co., Ltd.
Module type: JKM570M-7RL4-V (Median power) (BOM3)			
3-11	82XX20210819110 536440006	C1	Same as above
3-12	82XX20210819110 536440007	C2	

N/A

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Supplementary information:

*Sample No. 3-6 is frameless module for Impulse voltage test (MST 14).

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Absatz	Photovoltaic (PV) modules	Messergebnisse - Bemerkungen	Bewertung
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6	List of test samples			
<input type="checkbox"/> The modules tested were taken at random from a production batch and subjected to manufacturer's normal quality control and inspection for safety testing				N/A
<input checked="" type="checkbox"/> The modules tested were prototypes of a new design and not taken from a production batch.				
Module type: JKM550M-72HL4-V (Median power) (BOM4)				
Sample no.	Sample SN	Test sequence	Remarks / constructional characteristics (e.g. cell, backsheet, frame type)	
4-1	63xx2021081911 0536410002	A2	Front cover: 3.2mm tempered glass with external AR coating from WU XI HAIDA SAFETY GLASS CO., LTD. Rear cover: 0.310mm FFC-JW3010(plus) from Jollywood (Suzhou) Sunwatt Co., Ltd.	
4-2	63xx2021081911 0536410003	E1	Encapsulation material: 0.04mm F406P/ 0.04mm F806 from Hangzhou First PV Material Co., Ltd. Frame: 35mm 6005T5 from Henan Hengmei Aluminum Co., Ltd. Adhesive (frame and junction box): JS-606 from Hangzhou Zhijiang silicone chemicals Co., Ltd	
4-3	63xx2021081911 0536410004	E2	Solar Cell: 182mmx182mm x140± 14µm, 182M 247 MBB SAJ-BCPU from Jinko Solar Co., Ltd. Cell connectors: Φ0.35mm Sn60%Pb40% from Suzhou YourBest New Materials Co., Ltd.	
4-4*	63xx2021081911 0536410010	H	String connectors: 0.4mm x 4.0mm Sn60%Pb40% from Suzhou YourBest New Materials Co., Ltd. Junction box: PV-JK09Lxy (x=2, y=1) from Jiangxi Jinko PV Material Co., Ltd. Cable: 62930 IEC 131 1X2,5...10mm ² from Jiangxi Jinko PV Material Co., Ltd.	
4-5	63xx2021081911 0536410009	F+G1	Connector: PV-JK03M2/xy (Plug+Socket)(x=2,y= A or B or C or D) from Jiangxi Jinko PV Co., Ltd Bypass Diode: TPA4050-T (3 pcs) from Jiangxi Jinko PV Material Co., Ltd. Potting material: JS-1184 from Hangzhou Zhijiang silicone chemicals co., Ltd	
4-6	63xx2021081911 0536410008	G	Fluxing agent: 8000T20 from Shenzhen Huaihui Electronic Material Co., Ltd Fixing Tape: 0.085mm 9966 from Shanghai Hyperion Adhesive Material Co., Ltd	
Module type: JKM570M-7RL4-V (Median power) (BOM4)				
4-7	82XX202108191 10536440008	C1	Same as above	
4-8	82XX202108191 10536440009	C2		
Supplementary information:				
*Sample No. 4-4 is frameless module for Impulse voltage test (MST 14).				

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6	List of test samples		
<input type="checkbox"/> The modules tested were taken at random from a production batch and subjected to manufacturer's normal quality control and inspection for safety testing			
<input checked="" type="checkbox"/> The modules tested were prototypes of a new design and not taken from a production batch.			
Module type: JKM580M-78HL4-TV (Median power) (BOM5)			
Sample no.	Sample SN	Test sequence	Remarks / constructional characteristics (e.g. cell, backsheet, frame type)
5-1	62XX202110271 10545700032	A2	Front cover: 3.2 mm tempered glass with external AR coating from FLAT Glass Group Co., Ltd. Rear cover: 0.320mm TPCw1 from Lucky Film Co., Ltd. Encapsulation material: 0.55mm F406P /0.55mm TF8 from Hangzhou First PV Material Co., Ltd.
5-2	62XX202110271 10545700033	E1	Frame: 30mm Steel from Jiangsu Caesar Profile Technology Co., Ltd Adhesive (frame): MH-3668 from Jiangsu Minghao New Material Technology Co., Ltd. Solar Cell: 182mmx182mmx175µm±17.5µm 182M 247 MBB SAJ-BCPU from Jinko Solar Co., Ltd. Cell connectors: Φ0.30mm Sn63%Pb37% from Tony Share(Suzhou) Electronic Materials Technology Co., Ltd
5-3	62XX202110271 10545700021	E2	String connectors: 0.4x4.0mm Sn60%Pb40% from Tony Share(Suzhou) Electronic Materials Technology Co., Ltd Fluxing agent: SF56 from Asahi Fixing Tape: UV-1 from 3M Material Technology (suzhou) Co.,Ltd
5-4	62XX202110271 10545700019	M	Junction box: PV-JK09Lxy(x=1 or 2, y=1 or 2) from Jiangxi Jinko PV Material Co., Ltd. Cable: H1Z2Z2-K 1 X4,0mm ² /4mm ² from Jiangxi Jinko PV Material Co., Ltd. Connector: PV-JK03M/xy (Plug+Socket) (x=2, y=B) from Jiangxi Jinko PV Co.,Ltd
5-5	62XX202110271 10545700016	M	Bypass Diode: TPA4050-T from Jiangxi Jinko PV Material Co., Ltd. Potting material: 5299W-S from Shanghai Huitian New Material Co., Ltd. Adhesive (Junction Box): HT-8258 from Jiangsu Tiancheng Silicon Co., Ltd.
Supplementary information: N/A			

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II	IEC/EN 61215 Part 1 – Test requirements
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7	Marking and documentation (5)
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7.1	Name plate (5.1)
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	The module includes the following clear and indelible markings:		
	a) Name, registered trade name or registered trade mark of manufacturer	Marked on type label	P
	b) Type or model number designation	Marked on type label	P
	c) Serial number (unless marked on other part of product)	Encapsulated inside module	P
	d) Date and place of manufacture; alternatively serial number allowing to trace the date and place of manufacture	Traceable from serial number (checked during factory inspection)	P
	e) Maximum system voltage	Marked on type label	P
	f) Class for protection against electrical shock	Marked on type label	P
	g) Voltage at open-circuit or V_{oc} including tolerances	Marked on type label	P
	h) Current at short-circuit or I_{sc} including tolerances	Marked on type label	P
	i) Module maximum power or P_{max} including tolerances	Marked on type label	P
	All electrical data is shown at standard test conditions (1000 W/m ² , 25 °C, AM 1.5 according to IEC TS 61836).	Marked on type label	P

7.2	Documentation (5.2)
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7.2.1	Minimum requirements (5.2.1)
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	Modules are supplied with documentation describing the methods of electrical and mechanical installation as well as the electrical ratings of the module.	Available in installation manual	P
	The documentation states the class for protection against electrical shock under which the module has been qualified and any specific limitations required for that class.	Available in installation manual	P
	The documentation assures that installers and operators receive appropriate and sufficient documentation for safe installation, use and maintenance of the PV modules.	Available in installation manual	P

7.2.2	Information to be given in the documentation (5.2.2)
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	Maximum overcurrent protection rating (compliance is verified by reverse current overload test (MST 26)).	Available in installation manual	P
	Maximum series/parallel module configuration is recommended.	Available in installation manual	P
	Manufacturer's stated tolerance for V_{oc} , I_{sc} and maximum power output under standard test conditions	Marked on type label	P

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Absatz Clause	Photovoltaic (PV) modules Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse - Bemerkungen Measuring results - Remarks	Bewertung Evaluation
	Temperature coefficient for maximum output power	Available in data sheet	P
	Temperature coefficient for voltage at open-circuit	Available in data sheet	P
	Temperature coefficient for short-circuit current	Available in data sheet	P
	All electrical data mentioned above is shown as relative to standard test conditions (1000 W/m ² , 25 °C, AM 1.5 according to IEC TS 61836).	Marked on type label	P
	Nominal module operating temperature (NMOT) is specified.	Available in data sheet	P
	Performance at NMOT (MQT 06.2) is specified.	Available in data sheet	P
	Performance at low irradiance (MQT 07) is specified.	Available in data sheet	P
	The electrical documentation includes a detailed description of the electrical installation wiring method to be used, including:	N/A	N/A
	The minimum cable diameters for modules intended for field wiring	Available in installation manual	P
	Any limitations on wiring methods and wire management that apply to the wiring compartment or box	Limitations are documented in installation manual.	P
	The size, type, material and temperature rating of the conductors to be used	Available in installation manual	P
	Type of terminals for field wiring	Junction box is approved according to IEC 62790	P
	Specific PV connector model/types and manufacturer to which the module connectors are mated.	Available in installation manual	P
	The bonding method(s) to be used (if applicable); all provided or specified hardware is identified in the documentation.	Available in installation manual	P
	The type and ratings of bypass diode to be used (if applicable)	Junction box is approved according to IEC 62790	P
	Limitations to the mounting situation (e.g., slope, orientation, mounting means, cooling)	No limitations indicated.	N/A
	A statement indicating the fire rating(s) and the applied standard as well as the limitations to that rating (e.g., installation slope, sub structure or other applicable installation information)	Available in installation manual	P
	A statement indicating the design load per each mechanical means for securing the module as evaluated during the static mechanical load test according to MQT 16. At discretion of the manufacturer the test load and/or the safety factor γ_m may be noted, too.	Available in installation manual	P

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	The installation instructions include relevant parameters specified by manufacturer or the following statement or the equivalent: <i>"Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor current ratings, and size of controls connected to the PV output."</i>	Available in installation manual	P
7.2.3	Assembly instructions (5.2.3)		
	These are provided with a product shipped in subassemblies, and are detailed and adequate to the degree required to facilitate complete and safe assembly of the product.	No subassemblies	N/A
Supplementary information: N/A			

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8	Pass criteria (7)		
8.1	Output power and electric circuitry (7.2)		
8.1.1	Verification of rated label values (Gate #1) (7.2.1)		
	After stabilization, each individual module shall meet: $P_{\max}(\text{Lab}) \cdot \left(1 + \frac{ m_1 [\%]}{100}\right) \geq P_{\max}(\text{NP}) \cdot \left(1 - \frac{ t_1 [\%]}{100}\right)$ $\bar{P}_{\max}(\text{Lab}) \cdot \left(1 + \frac{ m_1 [\%]}{100}\right) \geq P_{\max}(\text{NP})$	See table in 9.4 (Gate #1 evaluation)	P
	After stabilization, each individual module shall meet: $V_{\text{OC}}(\text{Lab}) \cdot \left(1 + \frac{ m_2 [\%]}{100}\right) \leq V_{\text{OC}}(\text{NP}) \cdot \left(1 + \frac{ t_2 [\%]}{100}\right)$	See table in 9.4 (Gate #1 evaluation)	P
	After stabilization, each individual module shall meet: $I_{\text{SC}}(\text{Lab}) \cdot \left(1 + \frac{ m_3 [\%]}{100}\right) \leq I_{\text{SC}}(\text{NP}) \cdot \left(1 + \frac{ t_3 [\%]}{100}\right)$	See table in 9.4 (Gate #1 evaluation)	P
	m_1 = measurement uncertainty of laboratory for P_{\max} m_2 = measurement uncertainty of laboratory for V_{OC} m_3 = the measurement uncertainty of laboratory for I_{SC} t_1 = manufacturer's rated lower production tolerance for P_{\max} t_2 = manufacturer's rated upper production tolerance for V_{OC} t_3 = manufacturer's rated upper production tolerance for I_{SC} NP = name plate		-
8.1.2	Maximum power degradation during type approval testing (Gate #2) (7.2.2)		
	At the end of each test sequence, each test sample shall meet:	$r = 0.8$	P
	$P_{\max}(\text{Lab_Gate \#2}) \geq 0.95 \times P_{\max}(\text{Lab_Gate \#1}) \cdot \left(1 - \frac{r[\%]}{100}\right)$	See table in 9.25 (Gate #2 evaluation)	
	r = reproducibility		-

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8.1.3	Electrical circuitry (7.2.3)		
	Samples are not permitted to exhibit an open-circuit during the tests.	No open-circuit during tests	P
8.2	Visual defects (7.3)		
	There is no visual evidence of a major defect.	No major visual defect	P
8.3	Electrical safety (7.4)		
	The insulation test (MQT 03) requirements are met after the tests.	See tables below	P
	The wet leakage current test (MQT 15) requirements are met at the beginning and the end of each sequence.	See tables below	P
	Specific requirements of the individual tests are met.	See tables below	P
Supplementary information: N/A			

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III	IEC/EN 61215 Part 2 – Test procedures
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9	Overview of tests and test results Model type: JKM550M-72HL4-V (Median power) (BOM1)
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Test	Remarks	Result
Visual inspection (MQT 01)	See table 9.1	P
Maximum power determination (MQT 02)	See table 9.2	P
Insulation test (MQT 03)	See table 9.5	P
Measurement of temperature coefficients (MQT 04)	N/A	N/A
Measurement of nominal module operating temperature (NMOT) (MQT 05)	N/A	N/A
Performance at STC (MQT 06.1)	See table 9.3	P
Performance at NMOT (MQT 06.2)	N/A	N/A
Performance at low irradiance (MQT 07)	N/A	N/A
Outdoor exposure test (MQT 08)	N/A	N/A
Hot-spot endurance test (MQT 09)	N/A	N/A
UV preconditioning test (MQT 10)	See table 9.14	P
Thermal cycling test (50 cycles) (MQT 11)	See table 9.15	P
Thermal cycling test (200 cycles) (MQT 11)	N/A	N/A
Humidity-freeze test (MQT 12)	See table 9.16	P
Damp heat test (MQT 13)	See table 9.20	P
Retention of junction box on mounting surface (MQT 14.1)	See table 9.17	P
Test of cord anchorage (MQT 14.2)	Junction box is approved according to IEC 62790	P
Wet leakage current test (MQT 15)	See table 9.6	P
Static mechanical load test (MQT 16)	See table 9.21	P
Hail test (MQT 17)	N/A	N/A
Bypass diode thermal test (MQT 18.1)	N/A	N/A
Bypass diode functionality test (MQT 18.2)	See table 9.12.5	P
Initial stabilization (MQT 19.1)	See table 9.2	P
Final stabilization (MQT 19.2)	N/A	N/A
Supplementary information: N/A		

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9	Overview of tests and test results Model type: JKM570M-7RL4-V (Median power) (BOM1)		
Test	Remarks	Result	
Visual inspection (MQT 01)	See table 9.1	P	
Maximum power determination (MQT 02)	See table 9.2	P	
Insulation test (MQT 03)	See table 9.5	P	
Measurement of temperature coefficients (MQT 04)	N/A	N/A	
Measurement of nominal module operating temperature (NMOT) (MQT 05)	N/A	N/A	
Performance at STC (MQT 06.1)	See table 9.3	P	
Performance at NMOT (MQT 06.2)	N/A	N/A	
Performance at low irradiance (MQT 07)	N/A	N/A	
Outdoor exposure test (MQT 08)	N/A	N/A	
Hot-spot endurance test (MQT 09)	N/A	N/A	
UV preconditioning test (MQT 10)	N/A	N/A	
Thermal cycling test (50 cycles) (MQT 11)	N/A	N/A	
Thermal cycling test (200 cycles) (MQT 11)	N/A	N/A	
Humidity-freeze test (MQT 12)	N/A	N/A	
Damp heat test (MQT 13)	See table 9.20	P	
Retention of junction box on mounting surface (MQT 14.1)	N/A	N/A	
Test of cord anchorage (MQT 14.2)	Junction box is approved according to IEC 62790	P	
Wet leakage current test (MQT 15)	See table 9.6	P	
Static mechanical load test (MQT 16)	See table 9.21	P	
Hail test (MQT 17)	See table 9.22	P	
Bypass diode thermal test (MQT 18.1)	N/A	N/A	
Bypass diode functionality test (MQT 18.2)	See table 9.12.5	P	
Initial stabilization (MQT 19.1)	See table 9.2	P	
Final stabilization (MQT 19.2)	N/A	N/A	
Supplementary information: N/A			

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9	Overview of tests and test results		
	Model type: JKM550M-72HL4-V (Median power) (BOM2)		
Test	Remarks	Result	
Visual inspection (MQT 01)	See table 9.1	P	
Maximum power determination (MQT 02)	See table 9.2	P	
Insulation test (MQT 03)	See table 9.5	P	
Measurement of temperature coefficients (MQT 04)	N/A	N/A	
Measurement of nominal module operating temperature (NMOT) (MQT 05)	N/A	N/A	
Performance at STC (MQT 06.1)	See table 9.3	P	
Performance at NMOT (MQT 06.2)	N/A	N/A	
Performance at low irradiance (MQT 07)	N/A	N/A	
Outdoor exposure test (MQT 08)	N/A	N/A	
Hot-spot endurance test (MQT 09)	N/A	N/A	
UV preconditioning test (MQT 10)	See table 9.14	P	
Thermal cycling test (50 cycles) (MQT 11)	See table 9.15	P	
Thermal cycling test (200 cycles) (MQT 11)	N/A	N/A	
Humidity-freeze test (MQT 12)	See table 9.16	P	
Damp heat test (MQT 13)	See table 9.20	P	
Retention of junction box on mounting surface (MQT 14.1)	See table 9.17	P	
Test of cord anchorage (MQT 14.2)	Junction box is approved according to IEC 62790	P	
Wet leakage current test (MQT 15)	See table 9.6	P	
Static mechanical load test (MQT 16)	See table 9.21	P	
Hail test (MQT 17)	N/A	N/A	
Bypass diode thermal test (MQT 18.1)	N/A	N/A	
Bypass diode functionality test (MQT 18.2)	See table 9.12.5	P	
Initial stabilization (MQT 19.1)	See table 9.2	P	
Final stabilization (MQT 19.2)	N/A	N/A	
Supplementary information: N/A			

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9	Overview of tests and test results		
	Model type: JKM570M-7RL4-V (Median power) (BOM2)		
Test	Remarks	Result	
Visual inspection (MQT 01)	See table 9.1	P	
Maximum power determination (MQT 02)	See table 9.2	P	
Insulation test (MQT 03)	See table 9.5	P	
Measurement of temperature coefficients (MQT 04)	N/A	N/A	
Measurement of nominal module operating temperature (NMOT) (MQT 05)	N/A	N/A	
Performance at STC (MQT 06.1)	See table 9.3	P	
Performance at NMOT (MQT 06.2)	N/A	N/A	
Performance at low irradiance (MQT 07)	N/A	N/A	
Outdoor exposure test (MQT 08)	N/A	N/A	
Hot-spot endurance test (MQT 09)	N/A	N/A	
UV preconditioning test (MQT 10)	N/A	N/A	
Thermal cycling test (50 cycles) (MQT 11)	N/A	N/A	
Thermal cycling test (200 cycles) (MQT 11)	N/A	N/A	
Humidity-freeze test (MQT 12)	N/A	N/A	
Damp heat test (MQT 13)	See table 9.20	P	
Retention of junction box on mounting surface (MQT 14.1)	N/A	N/A	
Test of cord anchorage (MQT 14.2)	Junction box is approved according to IEC 62790	P	
Wet leakage current test (MQT 15)	See table 9.6	P	
Static mechanical load test (MQT 16)	See table 9.21	P	
Hail test (MQT 17)	N/A	N/A	
Bypass diode thermal test (MQT 18.1)	N/A	N/A	
Bypass diode functionality test (MQT 18.2)	See table 9.12.5	P	
Initial stabilization (MQT 19.1)	See table 9.2	P	
Final stabilization (MQT 19.2)	N/A	N/A	
Supplementary information: N/A			

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9	Overview of tests and test results		
	Model type: JKM550M-72HL4-V (Median power) (BOM3)		
Test	Remarks	Result	
Visual inspection (MQT 01)	See table 9.1	P	
Maximum power determination (MQT 02)	See table 9.2	P	
Insulation test (MQT 03)	See table 9.5	P	
Measurement of temperature coefficients (MQT 04)	N/A	N/A	
Measurement of nominal module operating temperature (NMOT) (MQT 05)	N/A	N/A	
Performance at STC (MQT 06.1)	See table 9.3	P	
Performance at NMOT (MQT 06.2)	N/A	N/A	
Performance at low irradiance (MQT 07)	N/A	N/A	
Outdoor exposure test (MQT 08)	N/A	N/A	
Hot-spot endurance test (MQT 09)	N/A	N/A	
UV preconditioning test (MQT 10)	N/A	N/A	
Thermal cycling test (50 cycles) (MQT 11)	N/A	N/A	
Thermal cycling test (200 cycles) (MQT 11)	N/A	N/A	
Humidity-freeze test (MQT 12)	N/A	N/A	
Damp heat test (MQT 13)	See table 9.20	P	
Retention of junction box on mounting surface (MQT 14.1)	N/A	N/A	
Test of cord anchorage (MQT 14.2)	Junction box is approved according to IEC 62790	P	
Wet leakage current test (MQT 15)	See table 9.6	P	
Static mechanical load test (MQT 16)	N/A	N/A	
Hail test (MQT 17)	N/A	N/A	
Bypass diode thermal test (MQT 18.1)	N/A	N/A	
Bypass diode functionality test (MQT 18.2)	See table 9.12.5	P	
Initial stabilization (MQT 19.1)	See table 9.2	P	
Final stabilization (MQT 19.2)	N/A	N/A	
Supplementary information: N/A			

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9	Overview of tests and test results		
	Model type:		
	JKM570M-7RL4-V (Median power) (BOM3)		
	JKM570M-7RL4-V (Median power) (BOM4)		
Test	Remarks	Result	
Visual inspection (MQT 01)	See table 9.1	P	
Maximum power determination (MQT 02)	See table 9.2	P	
Insulation test (MQT 03)	See table 9.5	P	
Measurement of temperature coefficients (MQT 04)	N/A	N/A	
Measurement of nominal module operating temperature (NMOT) (MQT 05)	N/A	N/A	
Performance at STC (MQT 06.1)	See table 9.3	P	
Performance at NMOT (MQT 06.2)	N/A	N/A	
Performance at low irradiance (MQT 07)	N/A	N/A	
Outdoor exposure test (MQT 08)	N/A	N/A	
Hot-spot endurance test (MQT 09)	N/A	N/A	
UV preconditioning test (MQT 10)	See table 9.14	P	
Thermal cycling test (50 cycles) (MQT 11)	See table 9.15	P	
Thermal cycling test (200 cycles) (MQT 11)	N/A	N/A	
Humidity-freeze test (MQT 12)	See table 9.16	P	
Damp heat test (MQT 13)	N/A	N/A	
Retention of junction box on mounting surface (MQT 14.1)	See table 9.17	P	
Test of cord anchorage (MQT 14.2)	Junction box is approved according to IEC 62790	P	
Wet leakage current test (MQT 15)	See table 9.6	P	
Static mechanical load test (MQT 16)	N/A	N/A	
Hail test (MQT 17)	N/A	N/A	
Bypass diode thermal test (MQT 18.1)	N/A	N/A	
Bypass diode functionality test (MQT 18.2)	See table 9.12.5	P	
Initial stabilization (MQT 19.1)	See table 9.2	P	
Final stabilization (MQT 19.2)	N/A	N/A	
Supplementary information: N/A			

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9	Overview of tests and test results		
	Model type: JKM550M-72HL4-V (Median power) (BOM4)		
Test	Remarks	Result	
Visual inspection (MQT 01)	See table 9.1	P	
Maximum power determination (MQT 02)	See table 9.2	P	
Insulation test (MQT 03)	See table 9.5	P	
Measurement of temperature coefficients (MQT 04)	N/A	N/A	
Measurement of nominal module operating temperature (NMOT) (MQT 05)	N/A	N/A	
Performance at STC (MQT 06.1)	See table 9.3	P	
Performance at NMOT (MQT 06.2)	N/A	N/A	
Performance at low irradiance (MQT 07)	N/A	N/A	
Outdoor exposure test (MQT 08)	N/A	N/A	
Hot-spot endurance test (MQT 09)	N/A	N/A	
UV preconditioning test (MQT 10)	N/A	N/A	
Thermal cycling test (50 cycles) (MQT 11)	N/A	N/A	
Thermal cycling test (200 cycles) (MQT 11)	N/A	N/A	
Humidity-freeze test (MQT 12)	N/A	N/A	
Damp heat test (MQT 13)	See table 9.20	P	
Retention of junction box on mounting surface (MQT 14.1)	N/A	N/A	
Test of cord anchorage (MQT 14.2)	Junction box is approved according to IEC 62790	P	
Wet leakage current test (MQT 15)	See table 9.6	P	
Static mechanical load test (MQT 16)	N/A	N/A	
Hail test (MQT 17)	N/A	N/A	
Bypass diode thermal test (MQT 18.1)	N/A	N/A	
Bypass diode functionality test (MQT 18.2)	See table 9.12.5	P	
Initial stabilization (MQT 19.1)	See table 9.2	P	
Final stabilization (MQT 19.2)	N/A	N/A	
Supplementary information: N/A			

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9	Overview of tests and test results		
	Model type: JKM580M-78HL4-TV (Median power) (BOM5)		
Test	Remarks	Result	
Visual inspection (MQT 01)	See table 9.1	P	
Maximum power determination (MQT 02)	See table 9.2	P	
Insulation test (MQT 03)	See table 9.5	P	
Measurement of temperature coefficients (MQT 04)	N/A	N/A	
Measurement of nominal module operating temperature (NMOT) (MQT 05)	N/A	N/A	
Performance at STC (MQT 06.1)	See table 9.3	P	
Performance at NMOT (MQT 06.2)	N/A	N/A	
Performance at low irradiance (MQT 07)	N/A	N/A	
Outdoor exposure test (MQT 08)	N/A	N/A	
Hot-spot endurance test (MQT 09)	N/A	N/A	
UV preconditioning test (MQT 10)	N/A	N/A	
Thermal cycling test (50 cycles) (MQT 11)	N/A	N/A	
Thermal cycling test (200 cycles) (MQT 11)	N/A	N/A	
Humidity-freeze test (MQT 12)	N/A	N/A	
Damp heat test (MQT 13)	See table 9.20	P	
Retention of junction box on mounting surface (MQT 14.1)	N/A	N/A	
Test of cord anchorage (MQT 14.2)	Junction box is approved according to IEC 62790	P	
Wet leakage current test (MQT 15)	See table 9.6	P	
Static mechanical load test (MQT 16)	See table 9.21	P	
Hail test (MQT 17)	N/A	N/A	
Bypass diode thermal test (MQT 18.1)	N/A	N/A	
Bypass diode functionality test (MQT 18.2)	N/A	N/A	
Initial stabilization (MQT 19.1)	See table 9.2	P	
Final stabilization (MQT 19.2)	N/A	N/A	
Supplementary information: N/A			

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9.1		Visual inspection (initial) – MQT 01		
Sample no.	Requirement	Nature and position of initial findings	Result	
1-1	No major visual defects	No major visual defects	P	
1-3		No major visual defects	P	
1-4		No major visual defects	P	
1-12		No major visual defects	P	
1-13		No major visual defects	P	
2-1		No major visual defects	P	
2-2		No major visual defects	P	
2-3		No major visual defects	P	
2-8		No major visual defects	P	
2-9		No major visual defects	P	
3-1		No major visual defects	P	
3-3		No major visual defects	P	
3-4		No major visual defects	P	
3-11		No major visual defects	P	
3-12		No major visual defects	P	
4-1		No major visual defects	P	
4-2		No major visual defects	P	
4-3		No major visual defects	P	
4-7		No major visual defects	P	
4-8		No major visual defects	P	
5-1		No major visual defects	P	
5-2		No major visual defects	P	
5-3		No major visual defects	P	
Supplementary information: N/A				

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9.2		Initial stabilization – MQT 19.1			
<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight <input type="checkbox"/> Other stabilization procedures					
Irradiance [W/m ²]			1000		Result
Module temperature [°C]			50		
Sample no.	Test	Integrated irradiation [kWh/m ²]	P _{max} [W]	Stabilization [%] *	
1-1	Initial	—	538.4	0.20	P
	Light-soaking 1	5	539.1		
	Light-soaking 2	5	539.5		
1-3	Initial	—	539.0	0.07	P
	Light-soaking 1	5	538.9		
	Light-soaking 2	5	539.3		
1-4	Initial	—	538.8	0.09	P
	Light-soaking 1	5	539.1		
	Light-soaking 2	5	538.6		
1-12	Initial	—	572.8	0.44	P
	Light-soaking 1	5	575.0		
	Light-soaking 2	5	575.3		
1-13	Initial	—	573.7	0.30	P
	Light-soaking 1	5	575.4		
	Light-soaking 2	5	575.3		
2-1	Initial	—	542.8	0.07	P
	Light-soaking 1	5	543.2		
	Light-soaking 2	5	542.8		
2-2	Initial	—	542.6	0.11	P
	Light-soaking 1	5	542.9		
	Light-soaking 2	5	542.3		
2-3	Initial	—	544.0	0.13	P
	Light-soaking 1	5	543.3		
	Light-soaking 2	5	543.5		
2-8	Initial	—	572.4	0.77	P
	Light-soaking 1	5	575.4		
	Light-soaking 2	5	576.8		
2-9	Initial	—	574.0	0.31	P
	Light-soaking 1	5	575.2		
	Light-soaking 2	5	575.8		

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3-1	Initial	—	542.9	0.11	P
	Light-soaking 1	5	542.7		
	Light-soaking 2	5	542.3		
3-3	Initial	—	543.4	0.22	P
	Light-soaking 1	5	542.6		
	Light-soaking 2	5	543.8		
3-4	Initial	—	543.8	0.26	P
	Light-soaking 1	5	542.8		
	Light-soaking 2	5	542.2		
3-11	Initial	—	573.4	0.40	P
	Light-soaking 1	5	573.4		
	Light-soaking 2	5	575.7		
3-12	Initial	—	574.5	0.29	P
	Light-soaking 1	5	574.5		
	Light-soaking 2	5	576.2		
4-1	Initial	—	538.6	0.23	P
	Light-soaking 1	5	538.5		
	Light-soaking 2	5	539.7		
4-2	Initial	—	538.9	0.26	P
	Light-soaking 1	5	539.3		
	Light-soaking 2	5	540.3		
4-3	Initial	—	539.0	0.26	P
	Light-soaking 1	5	539.3		
	Light-soaking 2	5	540.3		
4-7	Initial	—	573.0	0.50	P
	Light-soaking 1	5	575.3		
	Light-soaking 2	5	575.9		
4-8	Initial	—	574.0	0.30	P
	Light-soaking 1	5	575.4		
	Light-soaking 2	5	575.7		
5-1	Initial	—	578.3	0.72	P
	Light-soaking 1	5	576.1		
	Light-soaking 2	5	574.2		
5-2	Initial	—	579.7	0.69	P
	Light-soaking 1	5	577.7		
	Light-soaking 2	5	575.8		

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5-3	Initial	—	579.4	0.47	P
	Light-soaking 1	5	578.6		
	Light-soaking 2	5	576.7		

Supplementary information:

* Stabilization criterion: $(P_{max} - P_{min}) / P_{avg} \leq 1\%$ for three consecutive measurements.

Initial measurement corresponds to MQT 02 of IEC/EN 61215.

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9.3 Performance at STC (initial) – MQT 06.1							
Test method			<input checked="" type="checkbox"/> Simulator		<input type="checkbox"/> Natural sunlight		—
Illuminated direction			<input checked="" type="checkbox"/> Front side		<input type="checkbox"/> Rear side		
Ambient temperature [°C]			25 ± 2				
Irradiance [W/m ²]			1000*				
Module temperature [°C]			25 ± 0.2				
Sample no.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	—
1-1	539.5	41.36	13.044	49.69	13.517	80.3	—
1-3	539.3	41.35	13.041	49.66	13.517	80.3	—
1-4	538.0	42.12	12.789	49.63	13.510	80.3	—
1-12	575.3	44.84	12.831	53.67	13.387	80.1	—
1-13	575.3	44.83	12.834	53.64	13.386	80.1	—
2-1	542.8	41.35	13.125	49.65	13.604	80.4	—
2-2	542.3	41.35	13.113	49.62	13.626	80.2	—
2-3	543.5	43.12	12.903	49.67	13.621	80.3	—
2-8	576.8	44.83	12.866	53.78	13.380	80.2	—
2-9	575.8	44.87	12.833	53.66	13.385	80.2	—
3-1	542.3	42.18	12.857	49.64	13.608	80.3	—
3-3	543.8	42.12	12.891	49.70	13.633	80.3	—
3-4	542.4	42.14	12.870	49.61	13.628	80.2	—
3-11	575.7	44.88	12.829	53.69	13.385	80.1	—
3-12	576.2	44.81	12.859	53.64	13.398	80.2	—
4-1	539.7	41.88	12.887	49.58	13.557	80.3	—
4-2	540.3	41.90	12.896	49.67	13.544	80.3	—
4-3	539.0	41.88	12.869	49.56	13.542	80.3	—
4-7	575.9	44.83	12.846	53.70	13.389	80.1	—
4-8	575.7	44.86	12.834	53.70	13.393	80.1	—
5-1	580.3	45.30	12.808	53.68	13.530	79.9	—
5-2	581.4	45.43	12.799	53.68	13.546	80.0	—
5-3	580.2	45.08	12.871	53.67	13.562	79.8	—

*A pulse solar simulator class AAA conforming to the requirements of IEC 60904-9 is used.

Supplementary information: The non-illuminated side was covered with non-reflective background and aperture.

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9.4	Gate # 1 evaluation (STC)			
Manufacturer tolerances given on name plate	for P_{max}	t_1 [%]	± 3.0	—
	for V_{OC}	t_2 [%]	± 3.0	
	for I_{SC}	t_3 [%]	± 4.0	
Measurement uncertainty of test laboratory	for P_{max}	m_1 [%]	± 3.0 (for c-Si)	
	for V_{OC}	m_2 [%]	± 0.9 (for c-Si)	
	for I_{SC}	m_3 [%]	± 2.8 (for c-Si)	

9.4.1	Evaluation of output power for each module (STC)				
Sample no.	$P_{max,meas}$ [W]	$P_{max,meas,m1}$ [W]	$P_{max,NP}$ [W]	$P_{max,NP,t1}$ [W]	—
1-1	539.5	555.7	550.0	533.5	P
1-3	539.3	555.5	550.0	533.5	P
1-4	538.0	554.1	550.0	533.5	P
1-12	575.3	592.6	570.0	552.9	P
1-13	575.3	592.6	570.0	552.9	P
2-1	542.8	559.1	550.0	533.5	P
2-2	542.3	558.6	550.0	533.5	P
2-3	543.5	559.8	550.0	533.5	P
2-8	576.8	594.1	570.0	552.9	P
2-9	575.8	593.1	570.0	552.9	P
3-1	542.3	558.6	550.0	533.5	P
3-3	543.8	560.1	550.0	533.5	P
3-4	542.4	558.7	550.0	533.5	P
3-11	575.7	593.0	570.0	552.9	P
3-12	576.2	593.5	570.0	552.9	P
4-1	539.7	555.9	550.0	533.5	P
4-2	540.3	556.5	550.0	533.5	P
4-3	539.0	555.2	550.0	533.5	P
4-7	575.9	593.2	570.0	552.9	P
4-8	575.7	593.0	570.0	552.9	P
5-1	580.3	597.7	580.0	562.6	P
5-2	581.4	598.8	580.0	562.6	P
5-3	580.2	597.6	580.0	562.6	P

Supplementary information:

Pass criteria follow requirements of section 7.2.1 of IEC 61215-1.

$P_{max,meas,m1}$ = Measured maximum STC power taking positive measurement uncertainty into account

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$P_{max,NP,t1}$ = Nominal maximum STC power taking negative rated production tolerance into account

9.4.2 Evaluation of output power for average of all modules (STC)				
Module type	$P_{max,meas,avg}$ [W]	$P_{max,meas,avg,m1}$ [W]	$P_{max,NP}$ [W]	—
JKM550M-72HL4-V (Median power) (BOM1)	538.9	555.1	550.0	P
JKM570M-7RL4-V (Median power) (BOM1)	575.3	592.6	570.0	P
JKM550M-72HL4-V (Median power) (BOM2)	542.9	559.2	550.0	P
JKM570M-7RL4-V (Median power) (BOM2)	576.3	593.6	570.0	P
JKM550M-72HL4-V (Median power) (BOM3)	542.8	559.1	550.0	P
JKM570M-7RL4-V (Median power) (BOM3)	576.0	593.2	570.0	P
JKM550M-72HL4-V (Median power) (BOM4)	539.7	555.9	550.0	P
JKM570M-7RL4-V (Median power) (BOM4)	575.8	593.1	570.0	P
JKM580M-78HL4-TV (Median power) (BOM5)	580.6	598.1	580.0	P

Supplementary information:
Pass criteria follow requirements of section 7.2.1 of IEC 61215-1.
 $P_{max,meas,avg,m1}$ = Arithmetic average of meas. max. STC power taking positive measurement uncertainty into account

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9.4.3		Evaluation of open-circuit voltage for each module (STC)			
Sample no.	$V_{oc,meas}$ [V]	$V_{oc,meas,m2}$ [V]	$V_{oc,NP}$ [V]	$V_{oc,NP,t2}$ [V]	—
1-1	49.69	50.14	49.62	51.11	P
1-3	49.66	50.11	49.62	51.11	P
1-4	49.63	50.08	49.62	51.11	P
1-12	53.67	54.15	53.74	55.35	P
1-13	53.64	54.12	53.74	55.35	P
2-1	49.65	50.10	49.62	51.11	P
2-2	49.62	50.07	49.62	51.11	P
2-3	49.67	50.12	49.62	51.11	P
2-8	53.78	54.26	53.74	55.35	P
2-9	53.66	54.14	53.74	55.35	P
3-1	49.64	50.09	49.62	51.11	P
3-3	49.70	50.15	49.62	51.11	P
3-4	49.61	50.06	49.62	51.11	P
3-11	53.69	54.17	53.74	55.35	P
3-12	53.64	54.12	53.74	55.35	P
4-1	49.58	50.03	49.62	51.11	P
4-2	49.67	50.12	49.62	51.11	P
4-3	49.56	50.01	49.62	51.11	P
4-7	53.70	54.18	53.74	55.35	P
4-8	53.70	54.18	53.74	55.35	P
5-1	53.68	54.16	53.77	55.38	P
5-2	53.68	54.16	53.77	55.38	P
5-3	53.67	54.15	53.77	55.38	P

Supplementary information:

Pass criteria follow requirements of section 7.2.1 of IEC 61215-1.

$V_{oc,meas,m2}$ = Measured open-circuit voltage taking positive measurement uncertainty into account

$V_{oc,NP,t2}$ = Nominal open-circuit voltage taking positive rated production tolerance into account

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9.4.4 Evaluation of short-circuit current for each module (STC)

Sample no.	$I_{sc,meas}$ [A]	$I_{sc,meas,m3}$ [A]	$I_{sc,NP}$ [A]	$I_{sc,NP,t3}$ [A]	—
1-1	13.517	13.895	14.030	14.591	P
1-3	13.517	13.895	14.030	14.591	P
1-4	13.510	13.888	14.030	14.591	P
1-12	13.387	13.762	13.520	14.061	P
1-13	13.386	13.761	13.520	14.061	P
2-1	13.604	13.985	14.030	14.591	P
2-2	13.626	14.008	14.030	14.591	P
2-3	13.621	14.002	14.030	14.591	P
2-8	13.380	13.755	13.520	14.061	P
2-9	13.385	13.760	13.520	14.061	P
3-1	13.608	13.989	14.030	14.591	P
3-3	13.633	14.015	14.030	14.591	P
3-4	13.628	14.010	14.030	14.591	P
3-11	13.385	13.760	13.520	14.061	P
3-12	13.398	13.773	13.520	14.061	P
4-1	13.557	13.937	14.030	14.591	P
4-2	13.544	13.923	14.030	14.591	P
4-3	13.542	13.921	14.030	14.591	P
4-7	13.389	13.764	13.520	14.061	P
4-8	13.393	13.768	13.520	14.061	P
5-1	13.530	13.909	13.810	14.362	P
5-2	13.546	13.925	13.810	14.362	P
5-3	13.562	13.942	13.810	14.362	P

Supplementary information:

Pass criteria follow requirements of section 7.2.1 of IEC 61215-1.

$I_{sc,meas,m3}$ = Measured short-circuit current taking positive measurement uncertainty into account

$I_{sc,NP,t3}$ = Nominal short-circuit current taking positive rated production tolerance into account

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9.5		Insulation test (initial) – MQT 03					Result
Maximum system voltage [V _{DC}]			1500				
High voltage applied [V _{DC}]			4000/8000				
Insulation resistance measured at [V _{DC}]			1500				
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown			
				Yes (description)	No		
1-1	5.00	2.58	12.90	-	No	P	
1-3	5.00	2.58	12.90	-	No	P	
1-4	5.00	2.58	12.90	-	No	P	
1-12	5.00	2.73	13.65	-	No	P	
1-13	5.00	2.73	13.65	-	No	P	
2-1	5.00	2.58	12.90	-	No	P	
2-2	5.00	2.58	12.90	-	No	P	
2-3	5.00	2.58	12.90	-	No	P	
2-8	5.00	2.73	13.65	-	No	P	
2-9	5.00	2.73	13.65	-	No	P	
3-1	5.00	2.58	12.90	-	No	P	
3-3	5.00	2.58	12.90	-	No	P	
3-4	5.00	2.58	12.90	-	No	P	
3-11	5.00	2.73	13.65	-	No	P	
3-12	5.00	2.73	13.65	-	No	P	
4-1	5.00	2.58	12.90	-	No	P	
4-2	5.00	2.58	12.90	-	No	P	
4-3	5.00	2.58	12.90	-	No	P	
4-7	5.00	2.73	13.65	-	No	P	
4-8	5.00	2.73	13.65	-	No	P	
5-1	5.00	2.80	14.00	-	No	P	
5-2	5.00	2.80	14.00	-	No	P	
5-3	5.00	2.80	14.00	-	No	P	

Supplementary information:

Minimum requirement is 0.04 GΩ·m² for A > 0.1 m² and 0.4 GΩ for A ≤ 0.1 m².

Insulation tester can measure up to 5.00 GΩ.

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9.6 Wet leakage current test (initial) – MQT 15				
Insulation resistance measured at [V _{DC}]		1500		Result
Solution resistivity [$\Omega \cdot \text{cm}$]		≤ 3500		
Solution temperature [$^{\circ}\text{C}$]		22 ± 2		
Sample no.	R _{iso} [M Ω]	A [m ²]	R _{iso} · A [M $\Omega \cdot \text{m}^2$]	
1-1	5000.0	2.58	12900.0	P
1-3	4117.0	2.58	10621.9	P
1-4	5000.0	2.58	12900.0	P
1-12	5000.0	2.73	13650.0	P
1-13	5000.0	2.73	13650.0	P
2-1	3185.0	2.58	8217.3	P
2-2	5000.0	2.58	12900.0	P
2-3	5000.0	2.58	12900.0	P
2-8	5000.0	2.73	13650.0	P
2-9	5000.0	2.73	13650.0	P
3-1	5000.0	2.58	12900.0	P
3-3	5000.0	2.58	12900.0	P
3-4	5000.0	2.58	12900.0	P
3-11	5000.0	2.73	13650.0	P
3-12	5000.0	2.73	13650.0	P
4-1	5000.0	2.58	12900.0	P
4-2	5000.0	2.58	12900.0	P
4-3	4877.0	2.58	12582.7	P
4-7	5000.0	2.73	13650.0	P
4-8	5000.0	2.73	13650.0	P
5-1	5000.0	2.80	14000.0	P
5-2	5000.0	2.80	14000.0	P
5-3	5000.0	2.80	14000.0	P
Supplementary information: Minimum requirement is 40 M $\Omega \cdot \text{m}^2$. Insulation tester can measure up to 5000.0M Ω .				

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9.14	UV preconditioning test – MQT 10		
Module temperature [°C]	60 ± 5		Result
Ratio of UV-B irradiation (280 – 320 nm) [%]	3 – 10		
UV irradiation dose (280 – 400 nm) [kWh/m ²]	15		
Operation mode	<input checked="" type="checkbox"/> Short-circuit	<input type="checkbox"/> Open-circuit	
Sample no.	—		
1-3	—		N/A
1-4	—		N/A
2-2	—		N/A
2-3	—		N/A
3-11	—		N/A
3-12	—		N/A
4-7	—		N/A
4-8	—		N/A
Supplementary information: N/A			

9.14.1	Visual inspection after UV preconditioning test – MQT 01		
Sample no.	Requirement	Nature and position of findings	Result
1-3	No major visual defects	No major visual defects	P
1-4		No major visual defects	P
2-2		No major visual defects	P
2-3		No major visual defects	P
3-11		No major visual defects	P
3-12		No major visual defects	P
4-7		No major visual defects	P
4-8		No major visual defects	P
Supplementary information: N/A			

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9.14.2	Wet leakage current test after UV preconditioning test – MQT 15			
Insulation resistance measured at [V _{DC}]	1500			Result
Solution resistivity [$\Omega \cdot \text{cm}$]	≤ 3500			
Solution temperature [$^{\circ}\text{C}$]	22 ± 2			
Sample no.	R _{iso} [M Ω]	A [m ²]	R _{iso} ·A [M $\Omega \cdot \text{m}^2$]	
1-3	5000.0	2.58	12900.0	P
1-4	5000.0	2.58	12900.0	P
2-2	3361.0	2.58	9187.0	P
2-3	3226.0	2.58	8323.0	P
3-11	5000.0	2.73	13650.0	P
3-12	5000.0	2.73	13650.0	P
4-7	5000.0	2.73	13650.0	P
4-8	5000.0	2.73	13650.0	P
Supplementary information: Minimum requirement is 40 M $\Omega \cdot \text{m}^2$. Insulation tester can measure up to 5000.0 M Ω .				

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9.15	Thermal cycling test (50 cycles) – MQT 11		
Total number of cycles		50	Result
Sample no.	Open circuits (yes/no)		
1-3	No		N/A
1-4	No		N/A
2-2	No		N/A
2-3	No		N/A
3-11	No		N/A
3-12	No		N/A
4-7	No		N/A
4-8	No		N/A
Supplementary information: N/A			

9.15.1	Visual inspection after Thermal cycling test (50 cycles) – MQT 01		
Sample no.	Requirement	Nature and position of findings	Result
1-3	No major visual defects	No major visual defects	P
1-4		No major visual defects	P
2-2		No major visual defects	P
2-3		No major visual defects	P
3-11		No major visual defects	P
3-12		No major visual defects	P
4-7		No major visual defects	P
4-8		No major visual defects	P
Supplementary information: N/A			

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9.15.2	Wet leakage current test after Thermal cycling test (50 cycles) – MQT 15			
Insulation resistance measured at [V _{DC}]	1500			Result
Solution resistivity [$\Omega \cdot \text{cm}$]	≤ 3500			
Solution temperature [$^{\circ}\text{C}$]	22 ± 2			
Sample no.	R _{iso} [M Ω]	A [m ²]	R _{iso} ·A [M $\Omega \cdot \text{m}^2$]	
1-3	5000.0	2.58	12900.0	P
1-4	5000.0	2.58	12900.0	P
2-2	2423.0	2.58	6251.0	P
2-3	2275.0	2.58	5869.0	P
3-11	5000.0	2.73	13650.0	P
3-12	5000.0	2.73	13650.0	P
4-7	5000.0	2.73	13650.0	P
4-8	5000.0	2.73	13650.0	P
Supplementary information: Minimum requirement is 40 M $\Omega \cdot \text{m}^2$. Insulation tester can measure up to 5000.0 M Ω for sample No, 1-3, 1-4, 3-11, 3-12, 4-7 and 4-8.				

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Absatz	Photovoltaic (PV) modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

9.16	Humidity-freeze test – MQT 12		
Total number of cycles		10	Result
Sample no.	Open circuits (yes/no)		
1-3	No		N/A
1-4	No		N/A
2-2	No		N/A
2-3	No		N/A
3-11	No		N/A
3-12	No		N/A
4-7	No		N/A
4-8	No		N/A
Supplementary information: N/A			

9.16.1	Visual inspection after Humidity-freeze test – MQT 01		
Sample no.	Requirement	Nature and position of findings	Result
1-3	No major visual defects	No major visual defects	P
1-4		No major visual defects	P
2-2		No major visual defects	P
2-3		No major visual defects	P
3-11		No major visual defects	P
3-12		No major visual defects	P
4-7		No major visual defects	P
4-8		No major visual defects	P
Supplementary information: N/A			

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9.16.2	Wet leakage current test after Humidity-freeze test – MQT 15			
Insulation resistance measured at [V _{DC}]	1500			Result
Solution resistivity [$\Omega \cdot \text{cm}$]	≤ 3500			
Solution temperature [$^{\circ}\text{C}$]	22 ± 2			
Sample no.	R _{iso} [M Ω]	A [m ²]	R _{iso} ·A [M $\Omega \cdot \text{m}^2$]	
1-3	2433.0	2.58	6277.1	P
1-4	2509.0	2.58	6473.2	P
2-2	5000.0	2.58	12900.0	P
2-3	3261.0	2.58	8413.4	P
3-11	2793.0	2.73	7624.0	P
3-12	2996.0	2.73	8179.0	P
4-7	5000.0	2.73	13650.0	P
4-8	5000.0	2.73	13650.0	P
Supplementary information: Minimum requirement is 40 M $\Omega \cdot \text{m}^2$. Insulation tester can measure up to 5000.0 M Ω fro sample No. 2-2, 4-7 and 4-8.				

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9.17	Retention of junction box on mounting surface – MQT 14.1		
Sample no.		1-3, 2-2, 3-11, 4-7	N/A
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N]		40	
Applied force perpendicular to the mounting surface [N]		40	
Supplementary information: N/A			

9.17.1	Visual inspection after Retention of junction box on mounting surface – MQT 01		
Sample no.	Requirement	Nature and position of findings	Result
1-3	No major visual defects	No major visual defects	P
2-2	No major visual defects	No major visual defects	P
3-11	No major visual defects	No major visual defects	P
4-7	No major visual defects	No major visual defects	P
Supplementary information: N/A			

9.17.2	Wet leakage current test after Retention of junction box on mounting surface – MQT 15			
Insulation resistance measured at [V _{DC}]	1500			Result
Solution resistivity [$\Omega \cdot \text{cm}$]	≤ 3500			
Solution temperature [$^{\circ}\text{C}$]	22 ± 2			
Sample no.	R _{iso} [M Ω]	A [m ²]	R _{iso} ·A [M $\Omega \cdot \text{m}^2$]	
1-3	2423.0	2.58	6251.3	P
2-2	3117.0	2.58	8041.9	P
3-11	2822.0	2.73	7704.0	P
4-7	2932.0	2.73	8004.0	P
Supplementary information: Minimum requirement is 40 M $\Omega \cdot \text{m}^2$.				

9.18	Test of cord anchorage – MQT 14.2		
Remark:	Test not conducted, since junction box is qualified in accordance with IEC 62790.		
			P

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9.20	Damp heat test – MQT 13		
Total duration [h]	1000		Result
Sample no.	—		
1-12	—		N/A
1-13	—		N/A
2-8	—		N/A
2-9	—		N/A
3-3	—		N/A
3-4	—		N/A
4-2	—		N/A
4-3	—		N/A
5-2	—		N/A
5-3	—		N/A
Supplementary information: N/A			

9.20.1	Visual inspection after Damp heat test – MQT 01		
Sample no.	Requirement	Nature and position of findings	Result
1-12	No major visual defects	No major visual defects	P
1-13		No major visual defects	P
2-8		No major visual defects	P
2-9		No major visual defects	P
3-3		No major visual defects	P
3-4		No major visual defects	P
4-2		No major visual defects	P
4-3		No major visual defects	P
5-2		No major visual defects	P
5-3		No major visual defects	P
Supplementary information: N/A			

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9.20.2	Wet leakage current test after Damp heat test – MQT 15			
Insulation resistance measured at [V _{DC}]	1500			Result
Solution resistivity [$\Omega \cdot \text{cm}$]	≤ 3500			
Solution temperature [$^{\circ}\text{C}$]	22 ± 2			
Sample no.	R _{iso} [M Ω]	A [m ²]	R _{iso} ·A [M $\Omega \cdot \text{m}^2$]	
1-12	3687.0	2.73	10065.5	P
1-13	3557.0	2.73	9710.6	P
2-8	4382.0	2.73	11962.9	P
2-9	3972.0	2.73	10843.6	P
3-3	2355.0	2.58	6099.0	P
3-4	2232.0	2.58	5781.0	P
4-2	3577.0	2.58	9228.7	P
4-3	3642.0	2.58	9396.4	P
5-2	3185.0	2.80	8918.0	P
5-3	3722.0	2.80	10421.0	P
Supplementary information: Minimum requirement is 40 M $\Omega \cdot \text{m}^2$.				

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Absatz	Photovoltaic (PV) modules	Messergebnisse - Bemerkungen	Bewertung
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9.21	Static mechanical load test – MQT 16		
Load direction applied	Positive (downward)	Negative (upward)	N/A
Design load [Pa]	3600	1600	
Safety factor γ_m	1.5	1.5	
Test load [Pa]	5400	2400	
Mounting method	See below supplementary information		
Open circuits (yes/no)	No	No	P
Sample no.	Open circuits (yes/no)		N/A
1-12	No		P
2-8	No		P
5-2	No		P
5-3	No		P

Supplementary information:

Load was applied pneumatically;

For sample No. 1-12 and No. 2-8: 4 clamps on 400-500mm of the long side of the frame, 2 rails.

For sample No. 5-2: 4 clamps on 1/5-1/4mm of the long side of the frame, 2 rails.

For sample No. 5-3: 4 screws on 1/5-1/4mm of the long side of the frame, 2 rails.

1 cycle = 1 hour pressure load + 1 hour tensile load (total 3 cycles)

1st cycle = 5400Pa + 2400Pa

2nd cycle = 5400Pa + 2400Pa

3rd cycle = 5400Pa + 2400Pa

See photos in Appendix F for detailed mounting method.

9.21.1	Visual inspection after Static mechanical load test – MQT 01		
Sample no.	Requirement	Nature and position of findings	Result
1-12	No major visual defects	No major visual defects	P
2-8	No major visual defects	No major visual defects	P
5-2	No major visual defects	No major visual defects	P
5-3	No major visual defects	No major visual defects	P
Supplementary information: N/A			

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9.21.2	Wet leakage current test after Static mechanical load test – MQT 15			
Insulation resistance measured at [V _{DC}]	1500			Result
Solution resistivity [$\Omega \cdot \text{cm}$]	≤ 3500			
Solution temperature [$^{\circ}\text{C}$]	22 ± 2			
Sample no.	R _{iso} [M Ω]	A [m ²]	R _{iso} ·A [M $\Omega \cdot \text{m}^2$]	
1-12	5000.0	2.73	13650.0	P
2-8	5000.0	2.73	13650.0	P
5-2	3807.0	2.80	10659.0	P
5-3	4021.0	2.80	11258.0	P
Supplementary information: Minimum requirement is 40 M $\Omega \cdot \text{m}^2$.				

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9.22	Hail test – MQT 17		
Ice ball diameter [mm]	25		Result
Ice ball mass [g]	7.53 ± 2 %		
Ice ball velocity [m/s]	23 ± 5 %		
Number of impact locations	11		
Sample no.	—		
1-13	—		P
2-9	—		P
Supplementary information: N/A			

9.22.1	Visual inspection after Hail test – MQT 01		
Sample no.	Requirement	Nature and position of findings	Result
1-13	No major visual defects	No major visual defects	P
2-9	No major visual defects	No major visual defects	P
Supplementary information: N/A			

9.22.2	Wet leakage current test after Hail test – MQT 15		
Insulation resistance measured at [V _{DC}]	1500		Result
Solution resistivity [Ω·cm]	≤ 3500		
Solution temperature [°C]	22 ± 2		
Sample no.	R _{iso} [MΩ]	A [m ²]	R _{iso} ·A [MΩ·m ²]
1-13	5000.0	2.73	13650.0
2-9	3972.0	2.73	10843.6
Supplementary information: Minimum requirement is 40 MΩ·m ² . Insulation tester can measure up to 5000.0 MΩ.			

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9.23 Determination of reproducibility

The laboratory reproducibility has been determined by means of statistics analysis taken in a series of measurements within the past 3 years. It's value does not exceed 0.8% with a confidence level of 95%.

9.24 Performance at STC (final) – MQT 06.1

Test method		<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight						N/A
Ambient temperature [°C]		25 ± 2						
Irradiance [W/m ²]		1000*						
Module temperature [°C]		25 ± 0.2						
Sample no.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	Degradation [%]	
1-3	525.5	40.63	12.934	49.14	13.412	79.3	-2.56	
1-4	528.2	41.06	12.863	49.13	13.458	79.9	-1.82	
1-12	572.7	44.83	12.775	53.21	13.337	80.0	-0.45	
1-13	564.1	44.38	12.712	53.33	13.279	79.7	-1.95	
2-2	533.1	41.67	12.792	49.20	13.585	79.8	-1.70	
2-3	533.7	41.52	12.852	49.09	13.629	79.8	-1.80	
2-8	569.0	44.94	12.660	53.65	13.310	79.7	-1.35	
2-9	565.6	44.53	12.702	53.48	13.250	79.8	-1.77	
3-3	527.6	41.14	12.823	49.42	13.362	79.9	-2.98	
3-4	529.5	41.29	12.822	49.35	13.438	79.8	-2.38	
3-11	566.7	44.77	12.658	53.26	13.327	79.8	-1.56	
3-12	561.1	44.04	12.740	53.06	13.261	79.7	-2.62	
4-2	527.9	41.73	12.648	49.37	13.375	79.9	-2.30	
4-3	525.7	41.72	12.601	49.31	13.358	79.8	-2.47	
4-7	565.9	43.99	12.864	53.30	13.300	79.8	-1.74	
4-8	564.1	43.79	12.881	53.06	13.367	79.5	-2.01	
5-2	572.9	45.36	12.629	53.54	13.399	79.9	-1.47	
5-3	573.6	45.31	12.661	53.62	13.450	79.5	-1.13	

Supplementary information:

Negative degradation means power loss.

*A pulse solar simulator class AAA conforming to the requirements of IEC 60904-9 is used.

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9.25	Gate #2 evaluation		
Reproducibility r for P _{max} [%]		0.8	N/A

9.25.1	Evaluation of output power for each module			
Sample no.	P _{max,meas,Gate #1} [W]	P _{max,meas,Gate #1,r} [W]	P _{max,meas,Gate #2} [W]	Result
1-3	539.3	508.2	525.5	P
1-4	538.0	506.9	528.2	P
1-12	575.3	542.1	572.7	P
1-13	575.3	542.1	564.1	P
2-2	542.3	511.0	533.1	P
2-3	543.5	512.1	533.7	P
2-8	576.8	543.5	569.0	P
2-9	575.8	542.6	565.6	P
3-3	543.8	512.4	527.6	P
3-4	542.4	511.1	529.5	P
3-11	575.7	542.5	566.7	P
3-12	576.2	542.9	561.1	P
4-2	540.3	509.1	527.9	P
4-3	539.0	507.9	525.7	P
4-7	575.9	542.7	565.9	P
4-8	575.7	542.5	564.1	P
5-2	581.4	547.9	572.9	P
5-3	580.2	546.7	573.6	P

Supplementary information:

Pass criteria follow requirements of section 7.2.1 of IEC/EN 61215-1.

P_{max,meas,Gate #1} = Measured initial maximum STC power

P_{max,meas,Gate #1,r} = Measured initial maximum STC power taking reproducibility and degradation of 5% into account

P_{max,meas,Gate #2} = Measured final maximum STC power

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9.26		Insulation test (final) – MQT 03					Result
Maximum system voltage [V _{DC}]			1500		Dielectric breakdown		
High voltage applied [V _{DC}]			4000/8000				
Insulation resistance measured at [V _{DC}]			1500				
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Yes (description)	No		
1-1	5.00	2.58	12.90	-	No	P	
1-3	5.00	2.58	12.90	-	No	P	
1-4	5.00	2.58	12.90	-	No	P	
1-12	5.00	2.73	13.65	-	No	P	
1-13	5.00	2.73	13.65	-	No	P	
2-1	5.00	2.58	12.90	-	No	P	
2-2	5.00	2.58	12.90	-	No	P	
2-3	5.00	2.58	12.90	-	No	P	
2-8	5.00	2.73	13.65	-	No	P	
2-9	5.00	2.73	13.65	-	No	P	
3-1	5.00	2.58	12.90	-	No	P	
3-3	5.00	2.58	12.90	-	No	P	
3-4	5.00	2.58	12.90	-	No	P	
3-11	5.00	2.73	13.65	-	No	P	
3-12	5.00	2.73	13.65	-	No	P	
4-1	5.00	2.58	12.90	-	No	P	
4-2	5.00	2.58	12.90	-	No	P	
4-3	5.00	2.58	12.90	-	No	P	
4-7	5.00	2.73	13.65	-	No	P	
4-8	5.00	2.73	13.65	-	No	P	
5-2	5.00	2.80	14.00	-	No	P	
5-3	5.00	2.80	14.00	-	No	P	

Supplementary information:
Minimum requirement is 0.04 GΩ·m² for A > 0.1 m² and 0.4 GΩ for A ≤ 0.1 m².
Insulation tester can measure up to 5.00GΩ.

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9.27		Wet leakage current test (final) – MQT 15			Result
Insulation resistance measured at [V _{DC}]		1500			
Solution resistivity [Ω /cm]		≤ 3500			
Solution temperature [°C]		22 \pm 2			
Sample no.	R _{iso} [M Ω]	A [m ²]	R _{iso} ·A [M Ω ·m ²]		
1-1	5000.0	2.58	12900.0	P	
1-3	2351.0	2.58	6065.0	P	
1-4	2509.0	2.58	6473.0	P	
1-12	5000.0	2.73	13650.0	P	
1-13	5000.0	2.73	13650.0	P	
2-1	3517.0	2.58	9073.9	P	
2-2	3117.0	2.58	8041.9	P	
2-3	3261.0	2.58	8413.4	P	
2-8	5000.0	2.73	13650.0	P	
2-9	3267.0	2.73	8918.9	P	
3-1	5000.0	2.58	12900.0	P	
3-3	2011.0	2.58	5188.4	P	
3-4	2232.0	2.58	5758.6	P	
3-11	2810.0	2.73	7671.3	P	
3-12	2996.0	2.73	8179.1	P	
4-1	5000.0	2.58	12900.0	P	
4-2	3278.0	2.58	8457.2	P	
4-3	3642.0	2.58	9396.4	P	
4-7	2796.0	2.73	7633.1	P	
4-8	5000.0	2.73	13650.0	P	
5-2	5000.0	2.80	14000.0	P	
5-3	5000.0	2.80	14000.0	P	

Supplementary information:
Minimum requirement is 40 M Ω ·m².
Insulation tester can measure up to 5000.0 M Ω .

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IV	IEC/EN 61730 Part 1 – Requirements for construction
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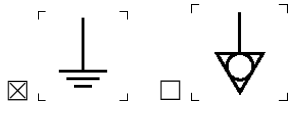
10	Classification, applications and intended use
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10.1	General (4.1)		
	Product details	See 1	N/A
	Classification, applications and intended use	See 1.3	N/A

11	Requirements for design and construction (5)
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11.1	General (5.1)		
	Incorporation of a PV module into the final assembly does not require any alteration of the PV module from its originally evaluated form. (It is not provided in subassemblies).	PV modules are completely assembled.	P
	Product shipped from the factory	<input checked="" type="checkbox"/> completely assembled <input type="checkbox"/> as subassemblies	N/A
	Equipotential bonding continuity is not interrupted by installation.	Confirmed by test MST 13.	P
	Any adjustable or movable structural part is provided with a locking device.	No such parts.	N/A
	PV modules do not have accessible burrs, sharp edges or sharp points.	Compliance checked by tests MST 01 and MST 06	P
	Parts are prevented from loosening or turning if this results in a risk of fire, electric shock, or injury to persons.	Compliance checked by tests MST 01	P

11.2	Marking and documentation (5.2)		
	Instructions related to safety are in an official language of the country where the equipment is to be installed.	Marking and documentation are written in English.	P
11.2.1	Marking (5.2.2)		
11.2.1.1	General (5.2.2.1)		
	Each PV module includes the following clear and indelible markings:	Compliance checked by tests MST 01 and MST 05	N/A
	a) Name, registered trade name, or registered trade mark of manufacturer	See section 7.1	P
	b) Type or model number designation	See section 7.1	P
	c) Serial number	See section 7.1	P
	d) Date and place of manufacture; alternatively serial number assuring traceability of date and place of manufacture	See section 7.1	P
	e) Polarity of terminals or leads	“+” and “-” indicated on terminal	P

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Absatz Clause	Photovoltaic (PV) modules Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse - Bemerkungen Measuring results - Remarks	Bewertung Evaluation
	f) Maximum system voltage or "V _{sys} "	See section 7.1	P
	g) Class of protection against electrical shock, in accordance with Clause 4 of IEC/EN 61730-1	See section 7.1	P
	h) Voltage at open-circuit or "V _{oc} " including manufacturing tolerances	See section 7.1	P
	i) Current at short-circuit or "I _{sc} " including manufacturing tolerances	See section 7.1	P
	j) Maximum power or "P _{max} " including manufacturing tolerances	See section 7.1	P
	k) Maximum overcurrent protection rating	Maximum series fuse rating indicated	P
	All electrical data are shown at standard test conditions (STC) (1000 W/m ² , (25 ± 2) °C, AM 1.5 according to IEC 60904-3).	See section 7.1	P
	PV connectors or wiring are marked with a symbol or/and hint „Do not disconnect under load“. Symbol or/and warning notice is imprinted or labelled close to connector.	Connector fulfill the requirements of IEC 62852. Symbol or warning notice indicated on connector.	P
	For Class II and Class 0 PV modules, the  (IEC 60417-6042: Caution, risk of electric shock) symbol is applied near the PV module electrical connection means.	Electrical hazard symbol indicated on type label	P
	PV modules are marked to indicate the class.	<input checked="" type="checkbox"/> class II:  <input type="checkbox"/> class III:  <input type="checkbox"/> class 0: no symbol	P
	PV modules provided with terminals for field wiring rated only for use with copper wire are marked, at or adjacent to the terminals, with the statement "Use copper wire only", "Cu only", or the equivalent.	PV modules provided with terminals for field wiring rated for use with all types of wiring material, do not need to be marked.	N/A
	PV modules provided with terminals for field wiring rated only for use with a different specific wiring material are marked with a similar statement referring to the rated material.	PV modules provided with terminals for field wiring rated for use with all types of wiring material, do not need to be marked.	N/A
11.2.1.2	Symbols (5.2.2.2)		
11.2.1.2.1	Equipotential bonding (5.2.2.2.1)		
	A wiring terminal or bonding location for equipotential bonding is identified with:		P
	No other terminal or location is identified in this manner.	Mounting hole may not be used for bonding.	P
11.2.1.2.2	Functional earthing (5.2.2.2.2)		
	Field installed functional earthing conductor is identified with the symbol:	No functional earthing.	N/A

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11.2.2	Documentation (5.2.3)		
	Documentation concerning electrical and mechanical installation is provided.	See section 7.2.1	P
	The documentation states the class for protection against electrical shock under which the PV module was qualified and any specific limitations required for that class.	See section 7.2.1	P
	Environmental conditions to which the module has been qualified are stated.		N/A
	- concerning temperature range, typically -40 °C to +40 °C.	See section 7.2.1	P
	- concerning wind/snow load including safety factor.	See section 7.2.1	P
	The documentation contains the following information:		N/A
	- Name, registered trade name, or registered trade mark of manufacturer	Available in data sheet	P
	- Type or model number designation	Available in data sheet	P
	- Maximum system voltage or " V_{sys} "	Available in data sheet	P
	- Class for protection against electrical shock, in accordance with Clause 4 of IEC/EN 61730	Available in data sheet	P
	- Voltage at open-circuit or " V_{oc} " including manufacturing tolerances	Available in data sheet	P
	- Current at short-circuit or " I_{sc} " including manufacturing tolerances	Available in data sheet	P
	- Maximum power or " P_{max} " including manufacturing tolerances	Available in data sheet	P
	- Maximum overcurrent protection rating (compliance verified by reverse current overload test (MST 26))	Available in data sheet	P
	- Recommended maximum series / parallel PV module configurations	Available in installation manual	P
	- Temperature coefficient for maximum output power	Available in data sheet	P
	- Temperature coefficient for voltage at open-circuit	Available in data sheet	P
	- Temperature coefficient for short-circuit current	Available in data sheet	P
	All electrical data are shown at standard test conditions (1000 W/m ² , (25 ± 2) °C, AM 1.5 according to IEC 60904-3).	Available in data sheet	P
	Detailed wiring method for electrical installation is included in the documentation, containing	N/A	N/A
	- minimum cable diameters for PV modules intended for field wiring	Available in installation manual	P
	- any limitations on wiring methods and wire management that apply to the PV module junction box	Available in installation manual	P
	- size, type, material, and temperature rating of the conductors to be used	Junction boxes fulfill the requirements of IEC 62790	P

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	- type of terminals for field wiring	Junction boxes fulfill the requirements of IEC 62790	P
	- specific PV connector model / types and manufacturer to which the PV module connectors can be mated	Available in installation manual	P
	- bonding to be used (if applicable) including all provided or specified hardware	Available in installation manual	P
	- type and ratings of bypass diode to be used (if applicable) as well as the installation instructions for those diodes (if applicable)	Junction boxes fulfill the requirements of IEC 62790	P
	The documentation includes	N/A	N/A
	- limitations to the mounting situation (e.g. slope, mounting means, cooling).	Available in installation manual	P
	- a statement indicating the fire rating(s)	<input checked="" type="checkbox"/> fire rating(s) and applied standards <input type="checkbox"/> statement that resistance to external fire sources was not evaluated	P
	- a statement indicating the minimum mechanical means for securing the PV module	Available in installation manual	P
	- a statement indicating the maximum altitude the PV module is designed for	≤ 2000 m above sea level Available in installation manual	P
	The documentation for roof mounting includes	N/A	N/A
	- a statement indicating the minimum mechanical means for securing the PV module	Available in installation manual	P
	- specific parameter(s) when the fire rating is dependent on a specific mounting structure, specific spacing, or specific means of attachment to the roof or structure	Available in installation manual	P
	The documentation includes a statement advising that external or otherwise artificially concentrated sunlight shall not be directed onto the front or back face of the PV module (if not qualified for).	Available in installation manual	P
	Assembly instructions are provided with a product shipped in subassemblies, and are detailed and adequate to the degree required to facilitate complete and safe assembly of the product.	No subassemblies	N/A
	The following or equivalent statement is included: "Under normal conditions, a photovoltaic module is likely to experience conditions that produce higher current and/or voltage than reported at standard test conditions. Accordingly, the values of <i>I</i> _{sc} and <i>V</i> _{oc} marked on this PV module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor current ratings, and size of controls (e.g. inverter) connected to the PV output." Safety factor may vary acc. to local conditions.	Available in installation manual	P
11.3	Electrical components and insulation (5.3)		

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11.3.1	Internal wiring (5.3.2)		
	Internal wiring has sufficient current carrying capacity for the relevant application.	Verified by MST 14 and MST 26	P
11.3.2	External wiring (5.3.3)		
	External wires and cables fulfil the requirements of IEC 62930 and/or EN 50618.	<input checked="" type="checkbox"/> EN 50618 <input type="checkbox"/> IEC 62930	P
11.3.3	Connectors (5.3.4)		
	External DC connectors fulfil the requirements of IEC 62852.	<input checked="" type="checkbox"/> IEC 62852	P
11.3.4	Junction boxes for PV modules (5.3.5)		
	Junction boxes for PV modules fulfil the requirements of IEC 62790.	<input checked="" type="checkbox"/> IEC 62790	P
11.3.5	Frontsheets and backsheets (5.3.6)		
	Frontsheet:		N/A
	Material of frontsheet:	<input checked="" type="checkbox"/> Glass <input type="checkbox"/> Polymeric material <input type="checkbox"/> Others	N/A
	Polymeric frontsheets meet relevant requirements of section 5.5.2.	Not applicable for glass frontsheet	N/A
	Polymeric frontsheets used as relied upon insulation fulfil requirements of		N/A
	- 5.6.4.3 for insulation in thin layers	Not applicable for glass frontsheet	N/A
	- 5.5.2.3 for electrical insulation	Not applicable for glass frontsheet	N/A
	Thermal index frontsheet (see also 5.5.2.3.3):	Not applicable for glass frontsheet	N/A
	Adhesion to encapsulant or glass is appropriate.	Compliance checked by IEC/EN 61730-2 tests listed in this report.	P
	Backsheet:		N/A
	Material of backsheet:	<input type="checkbox"/> Glass <input checked="" type="checkbox"/> Polymeric material <input type="checkbox"/> Others	N/A
	Polymeric backsheets meet relevant requirements of section 5.5.2.	See 11.5.1	P
	Polymeric backsheets used as relied upon insulation fulfil requirements of		—
	- 5.6.4.3 for insulation in thin layers	See 11.6.4.3	P
	- 5.5.2.3 for electrical insulation	See 11.5.1.3	P
	Thermal index backsheet (see also 5.5.2.3.3):	<input checked="" type="checkbox"/> TI <input type="checkbox"/> RTE <input type="checkbox"/> RTI	P

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	Adhesion to encapsulant or glass is appropriate.	Compliance checked by IEC/EN 61730-2 tests listed in this report.	P
11.3.6	Insulation barriers (5.3.7)		
	Polymeric insulation barrier meets the relevant requirements of 5.5.2.	See 11.5.1 Part of IEC 62790 qualification	P
	Barrier is held in place while keeping its required electrical and mechanical properties.	Compliance checked by IEC/EN 61730-2 tests listed in this report.	P
	Removal of barrier is only possible by using a tool.	Tools are necessary for removal of the insulation barrier.	P
11.3.7	Electrical connections (5.3.8)		
11.3.7.1	General (5.3.8.1)		
	Terminations are so designed, that the contact pressure is not transmitted through insulating material except ceramic, mica or other adequate material.	Compliance checked by MST 01.	P
	Prevention are taken that connections do not become loose, e.g. by using a washer.	Verified by MST 01 / MST 13	P
	End of a stranded conductor is not consolidated by soft soldering.	Part of IEC 62790 qualification.	P
	Precautions are taken to prevent contact stress which might impair electrical conductivity.	Part of IEC 62790 qualification.	P
11.3.7.2	Terminals for external cables and PV connector ribbons (5.3.8.2)		
	Terminals for electrical connections are suitable for the type and range of conductor cross-sectional areas according to specification of the manufacturer. They meet the requirements of IEC 62790.	<input checked="" type="checkbox"/> IEC 62790	P
	Insulated terminals are designed in a manner where a possible displacement that may result in a reduction of clearances and creepage distances is prevented.	Insulated terminals are qualified according to the related component standards. Part of IEC 62790 qualification.	P
11.3.7.3	Splices and connections inside a PV module (5.3.8.3)		
	Splices and connections inside a PV module are mechanically secured.	Part of IEC 62790 qualification.	P
	Electrical connections are soldered, welded, conductively adhered, crimped, or otherwise securely connected.	Compliance checked by IEC/EN 61730-2 tests listed in this report.	P
	A soldered or conductively adhered joint is additionally mechanically secured.	Part of IEC 62790 qualification.	P
11.3.8	Encapsulant (5.3.9)		
	Thermal properties are sufficient for intended application.	Compliance checked by IEC/EN 61730-2 tests listed in this report.	P

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	The insulation properties according to 5.5.2.3 are met, if applicable.	Compliance checked by IEC/EN 61730-2 tests listed in this report.	P
11.3.9	Bypass diodes (5.3.10)		
	Bypass diodes are rated to withstand the current and voltage for their intended use.	Compliance checked by MST 01, MST 07, MST 22 and MST 25 Datasheet values for bypass diode checked.	P
11.4	Mechanical and electromechanical connections (5.4)		
11.4.1	General (5.4.1)		
	Type of connection:	<input checked="" type="checkbox"/> Connection within frame <input checked="" type="checkbox"/> Mounting interfaces via adhesive <input checked="" type="checkbox"/> Frame to clamp a mounting system <input checked="" type="checkbox"/> Equipotential bonding <input checked="" type="checkbox"/> Attachment of junction box <input type="checkbox"/> Mechanical connections within the laminate	N/A
	Mechanical connections are durable to withstand the thermal, mechanical, and environmental stresses occurring in the application.	Compliance checked by inspection and by MST 13, MST 32, MST 34 and MST 37	P
	Parts intended to be removed are only detachable with the aid of tools.	Tools are necessary for removal.	P
	Lids attached without screws have one or several detectable facilities for enabling tools.	Compliance checked by the corresponding component standards.	P
	A tool does not come into contact with the live parts when the lid is removed with it.	Compliance checked by IEC 62790 tests.	P
	No friction occurs between surfaces as the sole means to inhibit the turning or loosening of a part, unless provisions to prevent unintended movement or rotation of the component are given.	No such parts.	N/A
11.4.2	Screw connections (5.4.2)		
	Screws and mechanical connections withstand the mechanical stresses occurring in normal use.	No screw is used.	N/A
	Screws are not made of a material which is soft or liable to creep.	No screw is used.	N/A
	Screws used to provide mechanical stability and continuity for equipotential bonding withstand the mechanical stresses occurring in normal use.	No screw is used.	N/A
	At least one screw per electrical-mechanical connection ensures the electrical connection between the metallic components.	No screw is used.	N/A

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Absatz Clause	Photovoltaic (PV) modules Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse - Bemerkungen Measuring results - Remarks	Bewertung Evaluation
	Screws used for mechanical and electrical connections with a nominal diameter of less than 3 mm are screwed into metal.	No screw is used.	N/A
	For screws used for mechanical and electrical connections two full threads are engaged into the metal.	No screw is used.	N/A
	Screwed and other fixed connections are in such a way that they do not come loose through torsion, bending stresses, vibration, etc.	No screw is used.	N/A
11.4.3	Rivets (5.4.3)		
	Rivets which serve as electrical as well as mechanical connections are locked against loosening.	No rivet is used.	N/A
11.4.4	Thread-cutting screws (5.4.4)		
	Thread-cutting and self-tapping screws are not used for interconnection of current-carrying parts made of a material which is soft or liable to creep.	No thread-cutting screw is used.	N/A
	No thread-forming or thread-cutting (self-tapping) screws (sheet metal screws) are used for the connection of current-carrying parts.	No thread-cutting screw is used.	N/A
	Thread-cutting (self-tapping) screws are not used if they are likely to be operated by the user or installer.	No thread-cutting screw is used.	N/A
	Thread-cutting and thread-forming screws, used to provide continuity for equipotential bonding, are such that it is not necessary to disturb the connection in normal use.	No thread-cutting screw is used.	N/A
	For equipotential bonding one screw is used if two full threads engage the metal.	No thread-cutting screw is used.	N/A
11.4.5	Form / press / tight fit (5.4.5)		
	Form/press/tight fits of metallic components which are not separately equipotential bonded are electrically connected.	Compliance checked by inspection and tested by MST 32, MST 34 and MST 13 pre and post the MST 32 and MST 34 tests.	P
11.4.6	Connections by adhesives (5.4.6)		
	Connections by adhesive for mounting means are sufficient.	Compliance checked by MST 34, MST 13, MST 32 for mounting adhesives.	P
	Fixing of junction box by adhesive is sufficient.	Compliance checked by MST 42, MST 17 for junction box adhesives.	P
	Adhesion of a polymer relied upon for insulation to another insulating layer is appropriate for the application.	Compliance checked by MST 34, MST 13, MST 32 for adhesives used for mounting means and MST 42, MST 17 for junction box adhesives.	P
	Requirements for adhesive materials are met.	See 11.5.2.2	P
	Connection by adhesive which is considered as cemented joint fulfills the requirements of 5.6.4.2.	No cemented joints	N/A

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Absatz Clause	Photovoltaic (PV) modules Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse - Bemerkungen Measuring results - Remarks	Bewertung Evaluation
11.4.7	Other connections (5.4.7)		
	Other connections (such as welded or soldered) as well as materials and processes to create the connections are appropriate for the application and for the intended use.	Compliance checked by MST 01 and MST 13.	P
	Other connections which are relied upon for equipotential bonding fulfil the requirements of MST 13.	Compliance checked by MST 01 and MST 13.	P
11.5	Materials (5.5)		
11.5.1	Polymeric materials (5.5.2)		
11.5.1.1	General (5.5.2.1)		
	Polymeric materials are able to durably and safely withstand the electrical, mechanical, thermal, environmental, and corrosive stresses occurring in the application.	Compliance checked by IEC/EN 61730-2 tests listed in this report and other environmental chamber tests including pre- and post-measurements and including assessment of creepages.	P
	Polymeric materials are resistant to electrical and mechanical property degradation.	Compliance checked by MST 37. Compliance checked by all tests including pre- and post-measurements and including assessment of creepages.	P
	Polymeric parts which ensure either the electrical or mechanical safety of the PV module or both, are resistant to electrical and mechanical property degradation. They comply with the requirements of the Materials creep test (MST 37) depending on their constructive function in the PV module.	Compliance checked by MST 37.	P
	Polymeric material used as a part of a cemented joint fulfills additionally the requirements of 5.6.4.2.	See 11.6.4.2 No cemented joints	N/A
11.5.1.2	Endurance to weathering stress (5.5.2.2)		
	Polymeric materials of the module and its components are durable to weathering stress.	Components are evaluated according to the relevant requirements in the applicable component standards. Compliance checked by IEC/EN 61730-2 tests listed in this report.	P
11.5.1.3	Polymeric materials used as electrical insulation (5.5.2.3)		
11.5.1.3.1	General (5.5.2.3.1)		
	Material relied upon for insulation is of adequate thickness, as described in Tables 3 and 4.	Components are evaluated according to the relevant requirement in the applicable component standard. Compliance checked by MST 04.	P

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Absatz Clause	Photovoltaic (PV) modules Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse - Bemerkungen Measuring results - Remarks	Bewertung Evaluation
	The temperature limits of materials used as insulation are not less than the maximum measured operating temperature of the specific material in application, as measured during the temperature test (MST 21).	See MST 21	P
11.5.1.3.2	Endurance to electrical stress (5.5.2.3.2)		
	Materials used as electrical insulation are in compliance with the insulation coordination requirements.	See 11.6.3	P
11.5.1.3.3	Endurance to thermal stress (5.5.2.3.3)		
	Materials used as relied upon insulation have a electrical relative thermal endurance, relative thermal index or temperature index (RTE / RTI / TI) appropriate for the application, at least 90°C.	<input checked="" type="checkbox"/> TI <input type="checkbox"/> RTE <input type="checkbox"/> RTI Compliance is checked with temperature test (MST 21).	P
11.5.1.3.4	Polymeric insulating materials used as external parts (5.5.2.3.4)		
	External polymeric parts of the PV module whose deterioration could impair the safety meet the following additional requirements:	N/A	N/A
	- Flammability class minimum V-1 according to IEC 60695-11-10	Part of IEC 62790 qualification.	P
	- Ball pressure test according to IEC 60695-10-2 with a temperature of 75°C (not applicable to insulation in thin layers)	Part of IEC 62790 qualification.	P
	- Ignitability test (MST 24) in final application (laminated or the PV module)	See section 12.10	P
	- Peel test (MST 35) for proof of cemented joints	No cemented joints	N/A
	- Lap shear strength test (MST 36) for proof of cemented joints	No cemented joints	N/A
11.5.1.3.5	Polymeric insulating parts supporting live parts (5.5.2.3.5)		
	External parts of insulating material supporting live parts including connections, and parts of polymeric material providing supplementary insulation or reinforced insulation, are sufficiently resistant to heat.	Part of IEC 62790 qualification.	P
	Other than elastomeric polymeric materials meet the following requirements:		N/A
	- Flammability class minimum HB	Part of IEC 62790 qualification.	P
	- Ball pressure test with a temperature of 125°C	Part of IEC 62790 qualification.	P
	- Material creep test (MST 37)	N/A	N/A
11.5.1.3.6	Polymeric materials used for mechanical functions (5.5.2.4)		
	Materials used for mechanical functions have a mechanical relative thermal endurance, relative thermal index or temperature index (RTE / RTI / TI) appropriate for the application, at least 90°C.	<input type="checkbox"/> TI <input type="checkbox"/> RTE <input checked="" type="checkbox"/> RTI Compliance is checked with Temperature test (MST 21).	P
11.5.2	Metallic materials (5.5.3)		
11.5.2.1	General (5.5.3.1)		

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	Metal parts are not in contact to other metal parts having a difference of their electrochemical potentials of more than 600 mV.	Compliance is checked by inspection.	P
	Iron or mild steel is plated, painted, or enamelled for protection against corrosion.	Compliance is checked by inspection.	P
	For iron or mild steel, corrosion protection is at least equivalent to a zinc coating of 0.015 mm thickness, and the manufacturer specified how they demonstrate this.	Compliance is checked by inspection.	P
11.5.2.2	Current carrying parts (5.5.3.2)		
	Assessed parts:	N/A	N/A
	Current-carrying parts have sufficient mechanical strength and electrical conductivity.	Compliance checked by IEC/EN 61730-2 tests listed in this report.	P
	Current-carrying materials are protected against corrosion.	N/A	N/A
	The coating for protective coated metal is capable of preventing corrosion according to either one of the listed standards.	N/A	N/A
	Coated metal is not used if the current-carrying parts are stressed by abrasion.	N/A	N/A
11.5.2.3	Adhesives (5.5.4)		
	Adhesives are appropriate for the application.	Compliance is checked by relevant tests of IEC 61730-2, including MST 42, MST 34, MST 01, MST 11 and MST 17.	P
	Adhesives as part of the relied upon electrical insulation meet the requirements of 5.5.2.3.3.	See section 11.5.1.3.3	P
11.6	Protection against electric shock (5.6)		
11.6.1	General (5.6.1)		
	Adequate protection against contact with hazardous live parts is provided and poses no risk of electric shock.	See section 11.6.2 – 11.6.4	P
11.6.2	Protection against accessibility to hazardous live parts (5.6.2)		
11.6.2.1	General (5.6.2.1)		
	Class of module	See safety ratings	N/A
	For Class 0 and Class II modules, adequate protection against accessibility to hazardous live parts (> 35 V DC) is provided.	Compliance is checked by MST 01 and MST 11.	P
	For Class 0 PV modules, accessible metal parts and accessible surfaces as well as live parts of different potential of the same circuit are separated by at least basic insulation.	Table 2 of 5.6.2.3	N/A
	For Class II PV modules, construction provides separation between accessible parts or accessible surfaces and hazardous live parts by double or reinforced insulation.	Table 2 of 5.6.2.3	N/A

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	For Class II PV modules, live parts of different potential of the same circuit are separated by at least basic insulation.	Table 2 of 5.6.2.3	N/A
	For Class III PV modules, construction provides separation between accessible parts or accessible surfaces and hazardous live parts by at least functional insulation.	Table 2 of 5.6.2.3	N/A
	In Class III PV modules live parts of different polarity are separated by at least functional insulation.	Table 2 of 5.6.2.3	N/A
	Materials used for realizing protection against accessibility of hazardous live parts by means of enclosure, insulation barrier or relied upon insulation comply with the requirements of 5.5.2 due to their application.	See 11.5.1	N/A
11.6.2.2	Protection by means of enclosures and insulation barriers (5.6.2.2)		
	Enclosures or insulation barriers are designed that, after mounting, the live parts are not accessible.	Encapsulant, glass, backsheet, junction box, cable and connectors acceptably insulate any live parts.	P
	The degree of protection of housing is not impaired by any possible deformation.	Encapsulant, glass, backsheet, junction box, cable and connectors acceptably insulate any live parts.	P
	Parts of enclosures and insulation barriers that provide protection are not removable without the use of a tool.	Tools are necessary for removal.	P
	Lids which are attached without screws have one or several detectable features, e.g. recesses.	Compliance verified by evaluation of components.	P
	Tools to open the lid do not come into contact with the live parts if lid is removed correctly.	Tools are necessary for removal.	P
	Insulation barriers are held in place and are not affected by influences expected during normal operation. Electrical and mechanical properties do not fall below the minimum acceptable values for the application.	Compliance checked by IEC/EN 61730-2 tests listed in this report.	P
	Parts are prevented from loosening or turning.	No such parts.	N/A
11.6.2.3	Protection by means of insulation of live parts (5.6.2.3)		
	An insulation material providing the sole insulation between a live part and an accessible metal part, or between uninsulated live parts not of the same potential, is of adequate thickness and of a material appropriate for the application. For requirements see table 2 in 5.6.2.3 (11.6.2.1).	Compliance verified by evaluation of materials and components.	P
11.6.3	Insulation coordination (5.6.3)		
	Components comply with the requirements for their relevant standards (5.6.3.1).	Compliance verified by evaluation of materials and components.	P
	Pollution degree (5.6.3.2):	See tables in 11.7	N/A
	Material group (5.6.3.3):	See tables in 11.7	N/A
	Clearance and creepage distance (5.6.3.4):	See tables in 11.7	N/A

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	Derating factor for altitude above 2000 m is considered.	N/A	N/A
11.6.4	Distance through insulation (5.6.4)		
11.6.4.1	General (5.6.4.1)		
	Polymeric materials for cemented insulation parts and insulation in thin layers withstand environmental, thermal, electrical and mechanical stresses as far as they occur.	See 11.5	N/A
	Distances through insulation (dti) of solid insulation comply with the minimum distance as required:	N/A	N/A
	System voltage	See safety ratings	N/A
	Distances through insulation (dti)	0.30mm /0.30mm (See 12.20)	P
	The insulation fulfils the material classification as given in IEC 60216-1, IEC 60216-2 and IEC 60216-5 (RTE/TI/RTI).	See 11.3.5	P
11.6.4.2	Cemented joints (5.6.4.2)		
	Cemented joints were considered as	<input type="checkbox"/> Edge seal <input type="checkbox"/> Interface between junction box and mounting surface <input type="checkbox"/> Others <input checked="" type="checkbox"/> No cemented joints	N/A
	Distances along cemented joints comply with the minimum distances as required in table 3:	—	N/A
	System voltage	No cemented joints	N/A
	Distance along cemented joints, req./meas. [mm]:	No cemented joints	N/A
	A distance can be considered as cemented joint if following requirements are met:	No cemented joints	N/A
	- Neither cracks nor voids in the insulating compounds have been occurred which either by themselves or in combination reduces the distances through the cemented joint below the required values.	No cemented joints	N/A
	- No breakdown at MST 16 (initial and final tests) with a 1.35 times higher test voltage occurred.	No cemented joints	N/A
	- No breakdown at MST 17 (initial and final tests) with a 1.35 times higher test voltage occurred.	No cemented joints	N/A
	- The electrically insulating adhesive / sealant has a volume resistivity of bigger than $50 \times 10^6 \Omega \text{ cm}$ (dry) / bigger than $10 \times 10^6 \Omega \text{ cm}$ (wet)	No cemented joints	N/A
	- Peel test (MST 35) was passed (rigid / flexible)	No cemented joints	N/A
	- Lap shear strength test (MST 36) was passed (rigid / rigid)	No cemented joints	N/A
11.6.4.3	Insulation in thin layers (5.6.4.3)		

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Absatz Clause	Photovoltaic (PV) modules Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse - Bemerkungen Measuring results - Remarks	Bewertung Evaluation
	Relied upon insulation in thin layers is applied at	<input checked="" type="checkbox"/> Backsheet <input type="checkbox"/> Frontsheet <input type="checkbox"/> Insulation within laminate <input type="checkbox"/> Others	N/A
	Initial construction of insulation in thin layers complies with requirements concerning thickness under consideration of figure 4 as described in table 3 or 4.	Backsheet fulfill the requirements of 2 PfG 1793/11.2017 / IEC TS 62788-2:2017.	P
	Construction of insulation in thin layers complies with requirements concerning RTE/TI/RTI.	Backsheet fulfill the requirements of 2 PfG 1793/11.2017 / IEC TS 62788-2:2017.	P
	Insulation in thin layers provides sufficient dielectric strength:	N/A	N/A
	Test voltage for single-layer sheet and for entire multi-layer sheet providing relied upon insulation (2000V + 4 times system voltage):	Backsheet fulfill the requirements of 2 PfG 1793/11.2017 / IEC TS 62788-2:2017.	P
	Single-layer sheet as well as entire multi-layer sheet in final application comply with following:	N/A	N/A
	Dielectric strength for basic insulation is provided after Cut susceptibility test (MST 12). Test voltage [V]: (1000V + 2 times system voltage)	See table 12.28.2	P

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Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

11.7 Clearance and creepage distances (5.6.3.4)									
Table 1: Design evaluation									
Model type:									
JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM1)									
JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM2)									
JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM3)									
JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM4)									
JKM580M-78HL4-TV (Median power) (BOM5)									
Clearance (cl) and creepage distance (cr) at/of/between:	Line of table 3 or 4	Type of insulation	Pollution degree	CTI Material group	Working voltage [V]	Clearance cl [mm]		Creepage cr [mm]	
						Required	Design ^a	Required	Design
Position 1: Shortest distance string connector – module edge	1a	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	1500	19.4	11.0	10.4	11.0
Position 2: Shortest distance cell – module edge	1a	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	1500	19.4	11.0	10.4	11.0
Position 3: Cell to cell	2	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	< 35	0.1	0.8	0.2	0.8
Position 4: String to string	2	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	< 35	0.1	2.0	0.2	2.0
Position 5: E.g., distance between terminals in JB or between terminal and outer JB enclosure.	3	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	< 35	0.5	N/A*	0.4	N/A*

Supplementary information:

* The junction box is potted and fulfils the requirements of IEC 62790.

^aList relevant position and test voltage for each clearance which is verified by Impulse voltage test according to IEC 60664-1.

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11.7	Clearance and creepage distances (5.6.3.4)								
Table 2: PV module evaluation MST 01 initial									
Sample no.			1-3, 1-8, 1-9,1-12, 2-2, 2-6, 2-7, 2-8, 3-3, 3-7, 3-8, 3-11 4-2, 4-3, 4-5, 4-6, 4-7						
Clearance (cl) and creepage distance (cr) at/of/between:	Line of table 3or 4	Type of insulation	Pollution degree	CTI Material group	Working voltage [V]	Clearance cl [mm]		Creepage cr [mm]	
						Required	Design ^a	Required	Design
Position 1: Shortest distance string connector – module edge	1a	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	1500	19.4	11.0	10.4	11.0
Position 2: Shortest distance cell – module edge	1a	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	1500	19.4	11.0	10.4	11.0
Position 3: Cell to cell	2	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	< 35	0.1	0.8	0.2	0.8
Position 4: String to string	2	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	< 35	0.1	2.0	0.2	2.0
Position 5: E.g., distance between terminals in JB or between terminal and outer JB enclosure.	3	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	< 35	0.5	N/A*	0.4	N/A*
Supplementary information: See photographs in Appendix F.									
* The junction box is potted and fulfils the requirements of IEC 62790.									
^a List relevant position and test voltage for each clearance which is verified by Impulse voltage test according to IEC 60664-1.									

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11.7	Clearance and creepage distances (5.6.3.4)								
Table 3: PV module evaluation MST 01 final									
Sample no.			1-3, 1-8, 1-9,1-12, 2-2, 2-6, 2-7, 2-8, 3-3, 3-7, 3-8, 3-11 4-2, 4-3, 4-5, 4-6, 4-7						
Clearance (cl) and creepage distance (cr) at/of/between:	Line of table 3 or 4	Type of insulation	Pollution degree	CTI Material group	Working voltage [V]	Clearance cl [mm]		Creepage cr [mm]	
						Required	Design ^a	Required	Design
Position 1: Shortest distance string connector – module edge	1a	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	1500	19.4	11.0	10.4	11.0
Position 2: Shortest distance cell – module edge	1a	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	1500	19.4	11.0	10.4	11.0
Position 3: Cell to cell	2	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	< 35	0.1	0.8	0.2	0.8
Position 4: String to string	2	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	< 35	0.1	2.0	0.2	2.0
Position 5: E.g., distance between terminals in JB or between terminal and outer JB enclosure.	3	<input type="checkbox"/> Functional <input type="checkbox"/> Basic <input type="checkbox"/> Suppl. <input checked="" type="checkbox"/> Reinforced	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa	< 35	0.5	N/A*	0.4	N/A*
Supplementary information:									
* The junction box is potted and fulfils the requirements of IEC 62790.									
^a List relevant position and test voltage for each clearance which is verified by Impulse voltage test according to IEC 60664-1.									

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V	IEC/EN 61730 Part 2 – Requirements for testing
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12	Overview of tests and test results Model type: JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM1)		
Test	Remarks	Result	
Visual inspection (MST 01)	See table 12.1	P	
Performance at STC (MST 02)	See table 12.3	P	
Maximum power determination (MST 03)	See table 12.2	P	
Insulation thickness test (MST 04)	See table 12.20	P	
Durability of markings (MST 05)	See table 12.32	P	
Sharp edge test (MST 06)	See table 12.33	P	
Bypass diode functionality test (MST 07)	See table 12.34	P	
Accessibility test (MST 11)	See table 12.6	P	
Cut susceptibility test (MST 12)	See table 12.28	P	
Continuity test for equipotential bonding (MST 13)	See table 12.7	P	
Impulse voltage test (MST 14)	See table 12.8	P	
Insulation test (MST 16)	See table 12.4	P	
Wet leakage current test (MST 17)	See table 12.5	P	
Temperature test (MST 21)	See table 12.9	P	
Hot-spot endurance test (MST 22)	N/A	N/A	
Fire test (MST 23)	See table 12.36	P	
Ignitability test (MST 24)	See table 12.10	P	
Bypass diode thermal test (MST 25)	N/A	N/A	
Reverse current overload test (MST 26)	N/A	N/A	
Module breakage test (MST 32)	See table 12.12	P	
Screw connections test (MST 33)	No screw connections	N/A	
Static mechanical load test (MST 34)	See table 9.21	P	
Peel test (MST 35)	No cemented joints	N/A	
Lap shear strength test (MST 36)	No cemented joints	N/A	
Materials creep test (MST 37)	See table 12.13	P	
Robustness of terminations test (MST 42)	N/A	N/A	
Thermal cycling (TC50) (MST 51a)	See table 9.15	P	
Thermal cycling test (TC200) (MST 51b)	N/A	N/A	
Humidity-freeze test (MST 52a)	See table 9.16	P	
Humidity-freeze test (MST 52b)	See table 12.17	P	

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<i>Clause</i>	<i>Anforderungen - Prüfungen / Requirements - Tests</i>	<i>Measuring results - Remarks</i>	<i>Evaluation</i>

Damp heat test (1000h) (MST 53a)	See table 9.20	P
Damp heat test (200h) (MST 53b)	See table 12.15	P
UV test (15 kWh/m ²) (MST 54a)	See table 9.14	P
UV test (60 kWh/m ²) (MST 54b)	See table 12.16	P
Cold conditioning (MST 55)	See table 12.23	P
Dry heat conditioning (MST 56)	See table 12.24	P
Supplementary information: N/A		

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12	Overview of tests and test results		
	Model type: JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM2)		
Test	Remarks	Result	
Visual inspection (MST 01)	See table 12.1	P	
Performance at STC (MST 02)	See table 12.3	P	
Maximum power determination (MST 03)	See table 12.2	P	
Insulation thickness test (MST 04)	N/A	N/A	
Durability of markings (MST 05)	See table 12.32	P	
Sharp edge test (MST 06)	See table 12.33	P	
Bypass diode functionality test (MST 07)	See table 12.34	P	
Accessibility test (MST 11)	See table 12.6	P	
Cut susceptibility test (MST 12)	See table 12.28	P	
Continuity test for equipotential bonding (MST 13)	See table 12.7	P	
Impulse voltage test (MST 14)	See table 12.8	P	
Insulation test (MST 16)	See table 12.4	P	
Wet leakage current test (MST 17)	See table 12.5	P	
Temperature test (MST 21)	N/A	N/A	
Hot-spot endurance test (MST 22)	N/A	N/A	
Fire test (MST 23)	N/A	N/A	
Ignitability test (MST 24)	N/A	N/A	
Bypass diode thermal test (MST 25)	N/A	N/A	
Reverse current overload test (MST 26)	N/A	N/A	
Module breakage test (MST 32)	See table 12.12	P	
Screw connections test (MST 33)	No screw connections	N/A	
Static mechanical load test (MST 34)	See table 9.21	P	
Peel test (MST 35)	No cemented joints	N/A	
Lap shear strength test (MST 36)	No cemented joints	N/A	
Materials creep test (MST 37)	See table 12.13	P	
Robustness of terminations test (MST 42)	See table 9.17	P	
Thermal cycling (TC50) (MST 51a)	See table 9.15	P	
Thermal cycling test (TC200) (MST 51b)	N/A	N/A	
Humidity-freeze test (MST 52a)	See table 9.16	P	
Humidity-freeze test (MST 52b)	See table 12.17	P	
Damp heat test (1000h) (MST 53a)	See table 9.20	P	
Damp heat test (200h) (MST 53b)	See table 12.15	P	
UV test (15 kWh/m ²) (MST 54a)	See table 9.14	P	

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UV test (60 kWh/m ²) (MST 54b)	See table 12.16	P
Cold conditioning (MST 55)	See table 12.23	P
Dry heat conditioning (MST 56)	See table 12.24	P
Supplementary information: N/A		

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12	Overview of tests and test results		
	Model type: JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (Median power) (BOM3)		
Test	Remarks	Result	
Visual inspection (MST 01)	See table 12.1	P	
Performance at STC (MST 02)	See table 12.3	P	
Maximum power determination (MST 03)	See table 12.2	P	
Insulation thickness test (MST 04)	See table 12.20	P	
Durability of markings (MST 05)	See table 12.32	P	
Sharp edge test (MST 06)	See table 12.33	P	
Bypass diode functionality test (MST 07)	See table 12.34	P	
Accessibility test (MST 11)	See table 12.6	P	
Cut susceptibility test (MST 12)	See table 12.28	P	
Continuity test for equipotential bonding (MST 13)	See table 12.7	P	
Impulse voltage test (MST 14)	See table 12.8	P	
Insulation test (MST 16)	See table 12.4	P	
Wet leakage current test (MST 17)	See table 12.5	P	
Temperature test (MST 21)	See table 12.9	P	
Hot-spot endurance test (MST 22)	See table 9.12	P	
Fire test (MST 23)	See table 12.36	P	
Ignitability test (MST 24)	See table 12.10	P	
Bypass diode thermal test (MST 25)	N/A	N/A	
Reverse current overload test (MST 26)	N/A	N/A	
Module breakage test (MST 32)	N/A	N/A	
Screw connections test (MST 33)	No screw connections	N/A	
Static mechanical load test (MST 34)	N/A	N/A	
Peel test (MST 35)	No cemented joints	N/A	
Lap shear strength test (MST 36)	No cemented joints	N/A	
Materials creep test (MST 37)	See table 12.13	P	
Robustness of terminations test (MST 42)	See table 9.17	P	
Thermal cycling (TC50) (MST 51a)	See table 9.15	P	
Thermal cycling test (TC200) (MST 51b)	N/A	N/A	
Humidity-freeze test (MST 52a)	See table 9.16	P	
Humidity-freeze test (MST 52b)	See table 12.17	P	
Damp heat test (1000h) (MST 53a)	See table 9.20	P	
Damp heat test (200h) (MST 53b)	See table 12.15	P	

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UV test (15 kWh/m ²) (MST 54a)	See table 9.14	P
UV test (60 kWh/m ²) (MST 54b)	See table 12.16	P
Cold conditioning (MST 55)	See table 12.23	P
Dry heat conditioning (MST 56)	See table 12.24	P
Supplementary information: N/A		

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12	Overview of tests and test results		
	Model type: JKM550M-72HL4-V and JKM570M-7RL4-V (Median power) (BOM4)		
Test	Remarks	Result	
Visual inspection (MST 01)	See table 12.1	P	
Performance at STC (MST 02)	See table 12.3	P	
Maximum power determination (MST 03)	See table 12.2	P	
Insulation thickness test (MST 04)	N/A	N/A	
Durability of markings (MST 05)	See table 12.32	P	
Sharp edge test (MST 06)	See table 12.33	P	
Bypass diode functionality test (MST 07)	See table 12.34	P	
Accessibility test (MST 11)	See table 12.6	P	
Cut susceptibility test (MST 12)	See table 12.28	P	
Continuity test for equipotential bonding (MST 13)	See table 12.7	P	
Impulse voltage test (MST 14)	See table 12.8	P	
Insulation test (MST 16)	See table 12.4	P	
Wet leakage current test (MST 17)	See table 12.5	P	
Temperature test (MST 21)	N/A	N/A	
Hot-spot endurance test (MST 22)	N/A	N/A	
Fire test (MST 23)	N/A	N/A	
Ignitability test (MST 24)	N/A	N/A	
Bypass diode thermal test (MST 25)	N/A	N/A	
Reverse current overload test (MST 26)	N/A	N/A	
Module breakage test (MST 32)	N/A	N/A	
Screw connections test (MST 33)	No screw connections	N/A	
Static mechanical load test (MST 34)	N/A	N/A	
Peel test (MST 35)	No cemented joints	N/A	
Lap shear strength test (MST 36)	No cemented joints	N/A	
Materials creep test (MST 37)	See table 12.13	P	
Robustness of terminations test (MST 42)	See table 9.17	P	
Thermal cycling (TC50) (MST 51a)	See table 9.15	P	
Thermal cycling test (TC200) (MST 51b)	N/A	N/A	
Humidity-freeze test (MST 52a)	See table 9.16	P	
Humidity-freeze test (MST 52b)	See table 12.17	P	
Damp heat test (1000h) (MST 53a)	See table 9.20	P	
Damp heat test (200h) (MST 53b)	See table 12.15	P	
UV test (15 kWh/m ²) (MST 54a)	See table 9.14	P	

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UV test (60 kWh/m ²) (MST 54b)	See table 12.16	P
Cold conditioning (MST 55)	See table 12.23	P
Dry heat conditioning (MST 56)	See table 12.24	P
Supplementary information: N/A		

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12	Overview of tests and test results		
	Module type: JKM580M-78HL4-TV (Median power) (BOM5)		
Test	Remarks	Result	
Visual inspection (MST 01)	See table 12.1	P	
Performance at STC (MST 02)	See table 12.3	P	
Maximum power determination (MST 03)	See table 12.2	P	
Insulation thickness test (MST 04)	N/A	N/A	
Durability of markings (MST 05)	See table 12.32	P	
Sharp edge test (MST 06)	See table 12.33	P	
Bypass diode functionality test (MST 07)	See table 12.34	P	
Accessibility test (MST 11)	See table 12.6	P	
Cut susceptibility test (MST 12)	N/A	N/A	
Continuity test for equipotential bonding (MST 13)	N/A	N/A	
Impulse voltage test (MST 14)	N/A	N/A	
Insulation test (MST 16)	See table 12.4	P	
Wet leakage current test (MST 17)	See table 12.5	P	
Temperature test (MST 21)	N/A	N/A	
Hot-spot endurance test (MST 22)	N/A	N/A	
Fire test (MST 23)	N/A	N/A	
Ignitability test (MST 24)	N/A	N/A	
Bypass diode thermal test (MST 25)	N/A	N/A	
Reverse current overload test (MST 26)	N/A	N/A	
Module breakage test (MST 32)	See table 12.12	P	
Screw connections test (MST 33)	No screw connections	N/A	
Static mechanical load test (MST 34)	See table 9.21	P	
Peel test (MST 35)	No cemented joints	N/A	
Lap shear strength test (MST 36)	No cemented joints	N/A	
Materials creep test (MST 37)	N/A	N/A	
Robustness of terminations test (MST 42)	N/A	N/A	
Thermal cycling (TC50) (MST 51a)	N/A	N/A	
Thermal cycling test (TC200) (MST 51b)	N/A	N/A	
Humidity-freeze test (MST 52a)	N/A	N/A	
Humidity-freeze test (MST 52b)	N/A	N/A	
Damp heat test (1000h) (MST 53a)	See table 9.20	P	
Damp heat test (200h) (MST 53b)	N/A	N/A	
UV test (15 kWh/m ²) (MST 54a)	N/A	N/A	

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UV test (60 kWh/m ²) (MST 54b)	N/A	N/A
Cold conditioning (MST 55)	N/A	N/A
Dry heat conditioning (MST 56)	N/A	N/A
Supplementary information: N/A		

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12.1	Visual inspection (initial) – MST 01		
Sample no.	Requirement	Nature and position of initial findings	Result
1-1	No major visual defects	No major visual defects	P
1-2		No major visual defects	P
1-3		No major visual defects	P
1-4		No major visual defects	P
1-5		No major visual defects	P
1-6		No major visual defects	P
1-7		No major visual defects	P
1-8		No major visual defects	P
1-9		No major visual defects	P
1-10		No major visual defects	P
1-11		No major visual defects	P
1-12		No major visual defects	P
2-1		No major visual defects	P
2-2		No major visual defects	P
2-4		No major visual defects	P
2-5		No major visual defects	P
2-6		No major visual defects	P
2-7		No major visual defects	P
2-8		No major visual defects	P
3-1		No major visual defects	P
3-2		No major visual defects	P
3-3		No major visual defects	P
3-5		No major visual defects	P
3-6		No major visual defects	P
3-7		No major visual defects	P
3-8		No major visual defects	P
3-9		No major visual defects	P
3-10		No major visual defects	P
3-11		No major visual defects	P
3-12		No major visual defects	P
4-1		No major visual defects	P
4-2		No major visual defects	P

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4-4		No major visual defects	P
4-5		No major visual defects	P
4-6		No major visual defects	P
4-7		No major visual defects	P
4-8		No major visual defects	P
5-1		No major visual defects	P
5-2		No major visual defects	P
5-3		No major visual defects	P
5-4		No major visual defects	P
5-5		No major visual defects	P

Supplementary information: N/A

12.2	Maximum power determination (initial) – MST 03		
Irradiance [W/m ²]	1000*		Result
Module temperature [°C]	25 ± 1		
Test method	<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight		
Sample no.	Appearance of initial IV-curve		
1-1	No kinks or other unusual characteristics		P
1-2	No kinks or other unusual characteristics		P
1-3	No kinks or other unusual characteristics		P
1-7	No kinks or other unusual characteristics		P
1-8	No kinks or other unusual characteristics		P
1-9	No kinks or other unusual characteristics		P
1-12	No kinks or other unusual characteristics		P
2-1	No kinks or other unusual characteristics		P
2-2	No kinks or other unusual characteristics		P
2-5	No kinks or other unusual characteristics		P
2-6	No kinks or other unusual characteristics		P
2-7	No kinks or other unusual characteristics		P
2-8	No kinks or other unusual characteristics		P
3-1	No kinks or other unusual characteristics		P
3-2	No kinks or other unusual characteristics		P
3-3	No kinks or other unusual characteristics		P
3-7	No kinks or other unusual characteristics		P
3-8	No kinks or other unusual characteristics		P

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3-11	No kinks or other unusual characteristics	P
4-1	No kinks or other unusual characteristics	P
4-2	No kinks or other unusual characteristics	P
4-4	No kinks or other unusual characteristics	P
4-5	No kinks or other unusual characteristics	P
4-6	No kinks or other unusual characteristics	P
4-7	No kinks or other unusual characteristics	P
5-1	No kinks or other unusual characteristics	P
5-2	No kinks or other unusual characteristics	P
5-3	No kinks or other unusual characteristics	P

Supplementary information:

* A pulse solar simulator class AAA conforming to the requirements of IEC 60904-9 is used.

Initial measurements for IEC/EN 61730 correspond to final measurements of IEC/EN 61215 (where applicable).

See Appendix D for measurement reports.

12.3	Performance at STC – MST 02						
Irradiance [W/m ²]	1000*						Result
Module temperature [°C]	25 ± 0.2						
Test method	<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight						
I _{sc} [A] with tolerance	13.290 ± 4% for BOM1-BOM4 13.810 ± 4% for BOM5						
V _{oc} [V] with tolerance	48.78 ± 3% for BOM1-BOM4 53.77 ± 3% for BOM5						
Sample no.	Pmax [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	
1-1	539.5	41.36	13.044	49.69	13.517	80.3	N/A
2-1	542.8	41.35	13.125	49.65	13.604	80.4	N/A
3-1	542.3	42.18	12.857	49.64	13.608	80.3	N/A
4-1	539.7	41.88	12.887	49.58	13.557	80.3	N/A
5-1	580.3	45.30	12.808	53.68	13.530	79.9	N/A

Supplementary information:

*A pulse solar simulator class AAA conforming to the requirements of IEC 60904-9 is used.

Nominal values of I_{sc} and V_{oc} were confirmed within IEC/EN 61215 qualification.

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12.4		Insulation test (initial) – MST 16					Result
Maximum system voltage [V _{DC}]		1500					
Cemented joints?		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]		8000					
Insulation resistance measured at [V _{DC}]		1500					
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown			
				Yes (description)	No		
1-1	5.00	2.58	12.90	-	No	P	
1-2	5.00	2.58	12.90	-	No	P	
1-3	5.00	2.58	12.90	-	No	P	
1-7	5.00	2.58	12.90	-	No	P	
1-8	100.00	2.58	258.00	-	No	P	
1-9	5.00	2.58	12.90	-	No	P	
1-12	5.00	2.73	13.65	-	No	P	
2-1	5.00	2.58	12.90	-	No	P	
2-2	5.00	2.58	12.90	-	No	P	
2-5	5.00	2.58	12.90	-	No	P	
2-6	100.00	2.58	258.00	-	No	P	
2-7	5.00	2.58	12.90	-	No	P	
2-8	5.00	2.73	13.65	-	No	P	
3-1	5.00	2.58	12.90	-	No	P	
3-2	5.00	2.58	12.90	-	No	P	
3-3	5.00	2.58	12.90	-	No	P	
3-6	5.00	2.58	12.90	-	No	P	
3-7	5.00	2.58	12.90	-	No	P	
3-8	5.00	2.58	12.90	-	No	P	
3-11	5.00	2.73	13.65	-	No	P	
4-1	5.00	2.58	12.90	-	No	P	
4-2	5.00	2.58	12.90	-	No	P	
4-4	5.00	2.58	12.90	-	No	P	
4-5	100.00	2.58	258.00	-	No	P	
4-6	5.00	2.58	12.90	-	No	P	
5-1	5.00	2.80	14.00	-	No	P	
5-2	5.00	2.80	14.00	-	No	P	

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5-3	5.00	2.80	14.00	-	No	P
5-4	5.00	2.80	14.00	-	No	P
5-5	5.00	2.80	14.00	-	No	P

Supplementary information:

Minimum requirement is 0.04 GΩ·m² for A > 0.1 m² and 0.4 GΩ for A ≤ 0.1 m².

Insulation tester can measure up to 5.00GΩ.

12.5	Wet leakage current test (initial) – MST 17				
Maximum system voltage [V _{DC}]	1500			Result	
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes				
Insulation resistance measured at [V _{DC}]	1500				
Solution resistivity [Ω·cm]	≤ 3500				
Solution temperature [°C]	22 ± 2				
Sample no.	R _{iso} [MΩ]	A [m ²]	R _{iso} ·A [MΩ·m ²]		
1-1	5000.0	2.58	12900.0		P
1-2	2925.0	2.58	7546.5		P
1-3	4117.0	2.58	10621.9		P
1-8	21900.0	2.58	56502.0		P
1-9	2994.0	2.58	7724.5		P
1-12	5000.0	2.73	13650.0		P
2-1	3185.0	2.58	8217.3		P
2-2	5000.0	2.58	12900.0		P
2-6	23500.0	2.58	60630.0		P
2-7	690.0	2.58	1780.2		P
2-8	5000.0	2.73	13650.0		P
3-1	5000.0	2.58	1643.0		P
3-2	637.0	2.58	12900.0		P
3-3	5000.0	2.58	12900.0		P
3-7	24800.0	2.58	64480.0		P
3-8	980.0	2.58	2528.0		P
3-11	5000.0	2.58	12900.0		P
4-1	5000.0	2.58	12900.0		P
4-2	5000.0	2.58	12900.0		P
4-5	21400.0	2.58	55212.0		P
4-6	5000.0	2.58	12900.0		P

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4-7	5000.0	2.73	13650.0	P
5-1	5000.0	2.80	14000.0	P
5-2	5000.0	2.80	14000.0	P
5-3	5000.0	2.80	14000.0	P
5-4	5000.0	2.80	14000.0	P
5-5	5000.0	2.80	14000.0	P

Supplementary information:
 Minimum requirement is 40 MΩ·m².
 Insulation tester can measure up to 5000.0 MΩ for 1-1, 1-12, 2-2, 2-8, 3-1, 3-3, 3-11, 4-1, 4-2, 4-6 and 4-7.

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12.6	Accessibility test (initial) – MST 11			
Applied force [N]		10		Result
Sample no.	Contact with live electrical part?	R _{iso} [MΩ]		
1-3	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
1-8	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0	P	
1-9	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
1-12	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
2-2	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
2-6	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0	P	
2-7	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
2-8	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
3-3	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
3-7	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0	P	
3-8	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
3-11	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
4-2	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
4-4	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
4-5	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
4-6	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
4-7	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
5-2	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P	
5-3	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	50.0	P	

Supplementary information:

The resistance tester can measure up to 100.0 MΩ for sample No.1-8, 2-6 and 3-7.

The resistance tester can measure up to 50.0 MΩ for sample No. 5-1.

The resistance tester can measure up to 60.0 MΩ for others.

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12.7	Continuity test of equipotential bonding (initial) – MST 13			
	Maximum overcurrent protection rating [A]	25		Result
	Current applied [A]	62.5		
	Duration of applied current [min]	2		
	Location of designated point for equipotential bonding	long side of the frame		
	No. of other conductive parts tested	3		
	Sample no.	Max. measured voltage [mV]	Max. calculated resistance [mΩ]	
	1-3	63.4 66.8 70.6	1.01 1.07 1.13	P
	1-5	232.5 290.3 207.8	3.72 4.64 3.32	P
	1-8	N/A	36.0 37.0 37.0	P
	1-9	183.4 159.2 146.2	2.93 2.55 2.34	P
	1-12	155.7 123.6 54.2	2.49 1.98 0.87	P
	2-2	40.4 85.7 54.8	1.45 1.37 0.88	P
	2-4	75.1 68.9 59.9	1.20 1.10 0.96	P
	2-6	N/A	36.0 37.0 37.0	P
	2-7	203.0 208.6 172.2	3.25 3.34 2.76	P
	2-8	125.2 115.5 72.5	2.01 1.85 1.16	P
	3-3	89.2	1.43	P

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	86.2 56.6	1.38 0.91	
3-7	N/A	36.0 37.0 37.0	P
3-8	224.8 204.8 190.2	3.60 3.28 3.04	P
3-11	153.3 118.3 56.3	2.45 1.89 0.90	P
4-2	135.0 114.7 76.0	2.16 1.84 1.21	P
4-5	N/A	36.0 37.0 37.0	P
4-6	274.5 290.4 260.3	4.39 4.64 4.16	P
4-7	93.7 86.0 51.2	1.50 1.38 0.82	P

Supplementary information: N/A

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12.8	Impulse voltage test – MST 14		
Maximum system voltage [V]	1500		Result
Rated impulse voltage [V]	16000		
Impulse test voltage [V]	19680		
Lab altitude [m]	4		
Sample no.	Test results		
1-7	No evidence of dielectric breakdown or surface tracking observed		P
2-5	No evidence of dielectric breakdown or surface tracking observed		P
3-6	No evidence of dielectric breakdown or surface tracking observed		P
4-4	No evidence of dielectric breakdown or surface tracking observed		P
Supplementary information: The impulse test voltage is applied acc. to a draft for IEC 61730-2 ED.3 MST 57, taking altitude correction factor into account, where $U_{\text{Test}} = U \times k_{\text{UL}} \times k_{\text{UO}} = 16000 \times 1.23 \times 1.00 = 19680\text{V}$.			

12.8.1	Visual inspection after Impulse voltage test – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-7	No major visual defects	No major visual defects	P
2-5	No major visual defects	No major visual defects	P
3-6	No major visual defects	No major visual defects	P
4-4	No major visual defects	No major visual defects	P
Supplementary information: Test sample was covered with conductive foil.			

12.8.2	Insulation test after Impulse voltage test – MST 16				
Maximum system voltage [V_{DC}]	1500				Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes				
High voltage applied [V_{DC}]	8000				
Insulation resistance measured at [V_{DC}]	1500				
Sample no.	R_{iso} [$\text{G}\Omega$]	A [m^2]	$R_{\text{iso}} \cdot A$ [$\text{G}\Omega \cdot \text{m}^2$]	Dielectric breakdown	
				Yes (description)	No
1-7	2.30	2.58	5.93	-	No
2-5	0.59	2.58	1.52	-	No
3-6	0.63	2.58	1.61	-	No
4-4	2.34	2.58	6.04	-	No

Supplementary information:
Minimum requirement is $0.04 \text{ G}\Omega \cdot \text{m}^2$ for $A > 0.1 \text{ m}^2$ and $0.4 \text{ G}\Omega$ for $A \leq 0.1 \text{ m}^2$.

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12.9	Temperature test – MST 21			
Sample no.	1-2			Result
Test method	<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight			
Irradiance [W/m ²]	1000			
Environmental temperature T _{ENV} [°C]	33.2			
Wind speed [m/s]	< 0.25			
Measuring location	Component temperature T _{OBS} [°C]	Normalised temperature T _{CON} [°C]	Component temperature limit [°C]	
Module frontsheet above the centre cell	64.7	71.5	N/A (glass)	P
Module backsheet below the centre cell	65.4	72.2	124	P
Terminal enclosure interior surface	54.0	60.9	110	P
Field wiring terminals	N/A	N/A	*	N/A
Insulation of the field wiring leads	39.5	46.3	90	P
External connector bodies	35.4	42.2	90	P
Bypass diode bodies	N/A	N/A	*	N/A
Supplementary information:				
* The field wiring terminals and bypass diode bodies are not accessible because the junction box is potted.				
** The exposure was performed under G _E which equals to 1000W/m ² + φ•300W/m ² according to standard 2PfG 2665/06.18.				
T _{CON} = T _{OBS} + (40 °C – T _{ENV}). Thermal material requirements are given in section 5.5 of IEC/EN 61730.				

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12.9	Temperature test – MST 21			
Sample no.	3-2			Result
Test method	<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight			
Irradiance [W/m ²]	1000			
Environmental temperature T _{ENV} [°C]	33.2			
Wind speed [m/s]	< 0.25			
Measuring location	Component temperature T _{OBS} [°C]	Normalised temperature T _{CON} [°C]	Component temperature limit [°C]	
Module frontsheet above the centre cell	64.7	71.5	N/A (glass)	P
Module backsheet below the centre cell	65.4	72.2	124	P
Terminal enclosure interior surface	54.0	60.9	110	P
Field wiring terminals	N/A	N/A	*	N/A
Insulation of the field wiring leads	39.5	46.3	90	P
External connector bodies	35.4	42.2	90	P
Bypass diode bodies	N/A	N/A	*	N/A
Supplementary information:				
* The field wiring terminals and bypass diode bodies are not accessible because the junction box is potted.				
** The exposure was performed under G _E which equals to 1000W/m ² + φ•300W/m ² according to standard 2PfG 2665/06.18.				
T _{CON} = T _{OBS} + (40 °C – T _{ENV}). Thermal material requirements are given in section 5.5 of IEC/EN 61730.				

12.9.1	Visual inspection after Temperature test – MST 01		
Sample no.	Nature and position of findings	Nature and position of findings	Result
1-2	No major visual defects	No major visual defects	P
3-2	No major visual defects	No major visual defects	P
Supplementary information: N/A			

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12.9.2	Insulation test after Temperature test – MST 16					
Maximum system voltage [V _{DC}]		1500				Result
Cemented joints?		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes				
High voltage applied [V _{DC}]		8000				
Insulation resistance measured at [V _{DC}]		1500				
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		
				Yes (description)	No	
1-2	5.00	2.58	12.90	-	No	P
3-2	5.00	2.58	12.90	-	No	P
Supplementary information: Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² . Insulation tester can measure up to 5.00GΩ.						

12.9.3	Wet leakage current test after Temperature test – MST 17					
Maximum system voltage [V _{DC}]		1500				Result
Cemented joints?		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes				
Insulation resistance measured at [V _{DC}]		1500				
Solution resistivity [Ω·cm]		≤ 3500				
Solution temperature [°C]		22 ± 2				
Sample no.	R _{iso} [MΩ]	A [m ²]	R _{iso} ·A [MΩ·m ²]			
1-2	5000.0	2.58	12900.0			P
3-2	2297.0	2.58	5926.0			P
Supplementary information: Minimum requirement is 40 MΩ·m ² .						

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12.10	Ignitability test – MST 24		
Sample no.	1-6		Result
Backsheet foil exposures			
<input type="checkbox"/> Ignition occurs			P
<input type="checkbox"/> The flame tip reaches a height of 150 mm above the flame application point at < 20s.			P
Frame adhesive exposures			
<input type="checkbox"/> Ignition occurs			P
<input type="checkbox"/> The flame tip reaches a height of 150 mm above the flame application point at < 20s.			P
Junction box adhesive exposures			
<input type="checkbox"/> Ignition occurs			P
<input type="checkbox"/> The flame tip reaches a height of 150 mm above the flame application point at < 20s.			P
Edge sealing exposures			
<input type="checkbox"/> Ignition occurs			P
<input type="checkbox"/> The flame tip reaches a height of 150 mm above the flame application point at < 20s.			P
Supplementary information: N/A			
Type label			
<input type="checkbox"/> Ignition occurs			P
<input type="checkbox"/> The flame tip reaches a height of 150 mm above the flame application point at < 20s.			P
Supplementary information: N/A			

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12.10	Ignitability test – MST 24	
Sample no.	3-5	Result
Backsheet foil exposures		
<input type="checkbox"/>	Ignition occurs	P
<input type="checkbox"/>	The flame tip reaches a height of 150 mm above the flame application point at < 20s.	P
Frame adhesive exposures		
<input type="checkbox"/>	Ignition occurs	P
<input type="checkbox"/>	The flame tip reaches a height of 150 mm above the flame application point at < 20s.	P
Junction box adhesive exposures		
<input type="checkbox"/>	Ignition occurs	P
<input type="checkbox"/>	The flame tip reaches a height of 150 mm above the flame application point at < 20s.	P
Edge sealing exposures		
<input type="checkbox"/>	Ignition occurs	P
<input type="checkbox"/>	The flame tip reaches a height of 150 mm above the flame application point at < 20s.	P
Supplementary information: N/A		
Type label		
<input type="checkbox"/>	Ignition occurs	P
<input type="checkbox"/>	The flame tip reaches a height of 150 mm above the flame application point at < 20s.	P
Supplementary information: N/A		

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12.12	Module breakage test – MST 32			
Weight of impactor [kg]	45.5 ± 0.5		Result	
Drop height [mm]	300			
Mounting technique used	4 Clamps			
Sample no.	Test results			
1-5	<input checked="" type="checkbox"/>	No breakage occurred		P
	<input type="checkbox"/>	PV module separated from the mounting structure or from the framing		
	<input type="checkbox"/>	Breakage occurred, but no shear or opening large enough for a 76 mm diameter sphere to pass freely has developed and no particles larger than 65 cm ² have been ejected from the sample.		
Supplementary information: N/A				

12.12	Module breakage test – MST 32			
Weight of impactor [kg]	45.5 ± 0.5		Result	
Drop height [mm]	300			
Mounting technique used	4 Clamps			
Sample no.	Test results			
2-4	<input checked="" type="checkbox"/>	No breakage occurred		P
	<input type="checkbox"/>	PV module separated from the mounting structure or from the framing		
	<input type="checkbox"/>	Breakage occurred, but no shear or opening large enough for a 76 mm diameter sphere to pass freely has developed and no particles larger than 65 cm ² have been ejected from the sample.		
Supplementary information: N/A				

12.12	Module breakage test – MST 32			
Weight of impactor [kg]	45.5 ± 0.5		Result	
Drop height [mm]	300			
Mounting technique used	4 Clamps			
Sample no.	Test results			
5-3	<input checked="" type="checkbox"/>	No breakage occurred		P
	<input type="checkbox"/>	PV module separated from the mounting structure or from the framing		
	<input type="checkbox"/>	Breakage occurred, but no shear or opening large enough for a 76 mm diameter sphere to pass freely has developed and no particles larger than 65 cm ² have been ejected from the sample.		
Supplementary information: N/A				

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12.12	Module breakage test – MST 32		
Weight of impactor [kg]	45.5 ± 0.5		Result
Drop height [mm]	300		
Mounting technique used	4 Screws		
Sample no.	Test results		P
5-4	<input checked="" type="checkbox"/>	No breakage occurred	
	<input type="checkbox"/>	PV module separated from the mounting structure or from the framing	
	<input type="checkbox"/>	Breakage occurred, but no shear or opening large enough for a 76 mm diameter sphere to pass freely has developed and no particles larger than 65 cm ² have been ejected from the sample.	
Supplementary information: N/A			

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12.13	Materials creep test – MST 37		
Temperature [°C]	105 ± 5		Result
Duration [h]	200		
Worst case mounting angle [°]	90		
Sample no.	—		
1-8	—		P
2-6	—		P
3-7	—		P
4-5	—		P
Supplementary information: N/A			

12.13.1	Visual inspection after Materials creep test – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-8	Creepage and clearance distances acc. to IEC/EN 61730-1, Table 3 are met.	No major visual defects	P
2-6	Creepage and clearance distances acc. to IEC/EN 61730-1, Table 3 are met.	No major visual defects	P
3-7	Creepage and clearance distances acc. to IEC/EN 61730-1, Table 3 are met.	No major visual defects	P
4-5	Creepage and clearance distances acc. to IEC/EN 61730-1, Table 3 are met.	No major visual defects	P
Supplementary information: N/A			

12.13.2	Insulation test after Materials creep test – MST 16					
Maximum system voltage [V _{DC}]	1500					Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]	8000					
Insulation resistance measured at [V _{DC}]	1500					
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		
				Yes (description)	No	
1-8	100.00	2.58	25800.00	-	No	P
2-6	100.00	2.58	25800.00	-	No	P
3-7	100.00	2.58	25800.00	-	No	P
4-5	100.00	2.58	25800.00	-	No	P
Supplementary information:						
Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² .						

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Insulation tester can measure up to 100.00 GΩ.

12.13.3	Wet leakage current test after Materials creep test – MST 17			
Maximum system voltage [V _{DC}]	1500			Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes			
Insulation resistance measured at [V _{DC}]	1500			
Solution resistivity [Ω·cm]	≤ 3500			
Solution temperature [°C]	22 ± 2			
Sample no.	R _{iso} [MΩ]	A [m ²]	R _{iso} ·A [MΩ·m ²]	
1-8	23100.0	2.58	59598.0	P
2-6	23900.0	2.58	62140.0	P
3-7	23600.0	2.58	61360.0	P
4-5	24300.0	2.58	62694.0	P
Supplementary information: Minimum requirement is 40 MΩ·m ² .				

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12.14	Insulation test – MST 16					
Maximum system voltage [V _{DC}]				1500		Result
Cemented joints?				<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		
High voltage applied [V _{DC}]				8000		
Insulation resistance measured at [V _{DC}]				1500		
Sample no.	R _{iso}	A	R _{iso} ·A	Dielectric breakdown		
	[GΩ]	[m ²]	[GΩ·m ²]	Yes (description)	No	
After UV preconditioning test – MST 54						
1-3	5.00	2.58	12.90	-	No	P
2-2	5.00	2.58	12.90	-	No	P
3-11	5.00	2.73	13.65	-	No	P
4-7	5.00	2.73	13.65	-	No	P
After Thermal cycling test (50 cycles) – MST 51						
1-3	5.00	2.58	12.90	-	No	P
2-2	5.00	2.58	12.90	-	No	P
3-11	5.00	2.73	13.65	-	No	P
4-7	5.00	2.73	13.65	-	No	P
After Humidity-freeze test – MST 52						
1-3	5.00	2.58	12.90	-	No	P
2-2	5.00	2.58	12.90	-	No	P
3-11	5.00	2.73	13.65	-	No	P
4-7	5.00	2.73	13.65	-	No	P
After Robustness of Termination test – MST 42						
1-3	5.00	2.58	12.90	-	No	P
2-2	5.00	2.58	12.90	-	No	P
3-11	5.00	2.73	13.65	-	No	P
4-7	5.00	2.73	13.65	-	No	P
After Damp heat test (1000h) – MST 53						
1-12	5.00	2.73	13.65	-	No	P
2-8	5.00	2.73	13.65	-	No	P
3-3	5.00	2.58	12.90	-	No	P
4-2	5.00	2.73	13.65	-	No	P
5-2	5.00	2.80	14.00	-	No	P
5-3	5.00	2.80	14.00	-	No	P

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After Static mechanical load test – MST 34						
1-12	5.00	2.73	13.65			
2-8	5.00	2.73	13.65	-	No	P
5-2	5.00	2.80	14.00			
5-3	5.00	2.80	14.00			

Supplementary information:
 Minimum requirement is 0.04 GΩ·m² for A > 0.1 m² and 0.4 GΩ for A ≤ 0.1 m².
 Insulation tester can measure up to 5.00 GΩ.

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12.15	Damp heat test (200h) – MST 53		
Total duration [h]	200		Result
Sample no.	—		
1-9	—		N/A
2-7	—		N/A
3-8	—		N/A
4-6	—		N/A
Supplementary information: N/A			

12.15.1	Visual inspection after Damp heat test (200h) – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-9	No major visual defects	No major visual defects	P
2-7	No major visual defects	No major visual defects	P
3-8	No major visual defects	No major visual defects	P
4-6	No major visual defects	No major visual defects	P
Supplementary information: N/A			

12.15.2	Insulation test after Damp heat test (200h) – MST 16					
Maximum system voltage [V _{DC}]	1500					Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]	8000					
Insulation resistance measured at [V _{DC}]	1500					
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		
				Yes (description)	No	
1-9	5.00	2.58	12.90	-	No	
2-7	5.00	2.58	12.90	-	No	
3-8	5.00	2.58	12.90	-	No	
4-6	5.00	2.58	12.90	-	No	
Supplementary information:						
Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² .						
Insulation tester can measure up to 5.00 GΩ.						

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12.16	UV test (front side) – MST 54		
Module temperature [°C]	60 ± 5		Result
Ratio of UV-B irradiation (280 – 320 nm) [%]	3 – 10		
UV irradiation dose (280 – 400 nm) [kWh/m²]	60		
Operation mode	<input checked="" type="checkbox"/> Short-circuit	<input type="checkbox"/> Open-circuit	
Sample no.	—		
1-9	—		N/A
2-7	—		N/A
3-8	—		N/A
4-6	—		N/A
Supplementary information: The module front side was exposed.			

12.16.1	Visual inspection after UV test (front side) – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-9	No major visual defects	No major visual defects	P
2-7	No major visual defects	No major visual defects	P
3-8	No major visual defects	No major visual defects	P
4-6	No major visual defects	No major visual defects	P
Supplementary information: N/A			

12.16.2	Insulation test after UV test (front side) – MST 16					
Maximum system voltage [V _{DC}]	1500					Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]	8000					
Insulation resistance measured at [V _{DC}]	1500					
Sample no.	R _{iso} [GΩ]	A [m²]	R _{iso} ·A [GΩ·m²]	Dielectric breakdown		
				Yes (description)	No	
1-9	5.00	2.58	12.90	-	No	P
2-7	5.00	2.58	12.90	-	No	P
3-8	5.00	2.58	12.90	-	No	P
4-6	5.00	2.58	12.90	-	No	P
Supplementary information: Minimum requirement is 0.04 GΩ·m² for A > 0.1 m² and 0.4 GΩ for A ≤ 0.1 m². Insulation tester can measure up to 5.00 GΩ.						

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12.17	Humidity-freeze test 1 – MST 52		
Total number of cycles	10		Result
Sample no.	Open circuits (yes/no)		
1-9	No		N/A
2-7	No		N/A
3-8	No		N/A
4-6	No		N/A
Supplementary information: N/A			

12.17.1	Visual inspection after Humidity-freeze test 1 – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-9	No major visual defects	No major visual defects	P
2-7	No major visual defects	No major visual defects	P
3-8	No major visual defects	No major visual defects	P
4-6	No major visual defects	No major visual defects	P
Supplementary information: N/A			

12.17.2	Insulation test after Humidity-freeze test 1 – MST 16					
Maximum system voltage [V _{DC}]	1500					Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]	8000					
Insulation resistance measured at [V _{DC}]	1500					
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		
				Yes (description)	No	
1-9	9.37	2.58	24.17	-	No	
2-7	6.82	2.58	17.60	-	No	
3-8	10.60	2.58	27.35	-	No	
4-6	20.50	2.58	52.89	-	No	
Supplementary information:						
Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² .						

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12.18	UV test (back side) – MST 54		
Module temperature [°C]	60 ± 5		Result
Ratio of UV-B irradiation (280 – 320 nm) [%]	3 – 10		
UV irradiation dose (280 – 400 nm) [kWh/m ²]	60		
Operation mode	<input checked="" type="checkbox"/> Short-circuit	<input type="checkbox"/> Open-circuit	
Sample no.	—		
1-9	—		N/A
2-7	—		N/A
3-8	—		N/A
4-6	—		N/A
Supplementary information: The module back side was exposed.			

12.18.1	Visual inspection after UV test (back side) – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-9	No major visual defects	No major visual defects	P
2-7	No major visual defects	No major visual defects	P
3-8	No major visual defects	No major visual defects	P
4-6	No major visual defects	No major visual defects	P
Supplementary information: N/A			

12.18.2	Insulation test after UV test (back side) – MST 16					
Maximum system voltage [V _{DC}]	1500					Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]	8000					
Insulation resistance measured at [V _{DC}]	1500					
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		
				Yes (description)	No	
1-9	5.00	2.58	12.90	-	No	P
2-7	5.00	2.58	12.90	-	No	P
3-8	5.00	2.58	12.90	-	No	P
4-6	5.00	2.58	12.90	-	No	P
Supplementary information: Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² . Insulation tester can measure up to 5.00 GΩ.						

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12.19	Humidity-freeze test 2 – MST 52		
Total number of cycles	10		Result
Sample no.	Open circuits (yes/no)		
1-9	No		N/A
2-7	No		N/A
3-8	No		N/A
4-6	No		N/A
Supplementary information: N/A			

12.19.1	Visual inspection after Humidity-freeze test 2 – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-9	No major visual defects	No major visual defects	P
2-7	No major visual defects	No major visual defects	P
3-8	No major visual defects	No major visual defects	P
4-6	No major visual defects	No major visual defects	P
Supplementary information: N/A			

12.19.2	Insulation test after Humidity-freeze test 2 – MST 16					
Maximum system voltage [V _{DC}]	1500					Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]	8000					
Insulation resistance measured at [V _{DC}]	1500					
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		
				Yes (description)	No	
1-9	3.42	2.58	8.82	-	No	
2-7	4.19	2.58	10.81	-	No	
3-8	5.00	2.58	12.90	-	No	
4-6	5.00	2.58	12.90	-	No	
Supplementary information:						
Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² .						
Insulation tester can measure up to 5.00 GΩ.						

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12.19.3	Wet leakage current test after Humidity-freeze test 2 – MST 17			
Maximum system voltage [V _{DC}]	1500			Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes			
Insulation resistance measured at [V _{DC}]	1500			
Solution resistivity [Ω·cm]	≤ 3500			
Solution temperature [°C]	22 ± 2			
Sample no.	R _{iso} [MΩ]	A [m ²]	R _{iso} ·A [MΩ·m ²]	
1-9	3563.0	2.58	9192.0	P
2-7	1920.0	2.58	4953.0	P
3-8	1990.0	2.58	5134.0	P
4-6	5000.0	2.58	12900.0	P
Supplementary information: Minimum requirement is 40 MΩ·m ² . Insulation tester can measure up to 5000.0 MΩ.				

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12.23	Cold conditioning 1 – MST 55		
Temperature [°C]	-40 ± 3		Result
Duration [h]	48		
Sample no.	—		N/A
1-8	—		
2-6	—		
3-7	—		
4-5	—		
Supplementary information: N/A			

12.23.1	Visual inspection after Cold conditioning 1 – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-8	No major visual defects	No major visual defects	P
2-6	No major visual defects	No major visual defects	P
3-7	No major visual defects	No major visual defects	P
4-5	No major visual defects	No major visual defects	P
Supplementary information: N/A			

12.23.2	Insulation test after Cold conditioning 1 – MST 16					
Maximum system voltage [V _{DC}]	1500					Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]	8000					
Insulation resistance measured at [V _{DC}]	1500					
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		P
				Yes (description)	No	
1-8	100.0	2.58	2580.0	-	No	
2-6	100.0	2.58	2580.0	-	No	
3-7	100.0	2.58	2580.0	-	No	
4-5	100.0	2.58	2580.0	-	No	
Supplementary information:						
Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² .						
Insulation tester can measure up to 100.0 GΩ.						

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12.24	Dry heat conditioning – MST 56		
Temperature [°C]	105 ± 5		Result
Relative humidity [%]	< 50		
Duration [h]	200		
Sample no.	—		
1-8	—		N/A
2-6	—		N/A
3-7	—		N/A
4-5	—		N/A
Supplementary information: N/A			

12.24.1	Visual inspection after Dry heat conditioning – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-8	No major visual defects	No major visual defects	P
2-6	No major visual defects	No major visual defects	P
3-7	No major visual defects	No major visual defects	P
4-5	No major visual defects	No major visual defects	P
Supplementary information: N/A			

12.24.2	Insulation test after Dry heat conditioning – MST 16					
Maximum system voltage [V _{DC}]	1500					Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]	8000					
Insulation resistance measured at [V _{DC}]	1500					
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		
				Yes (description)	No	
1-8	100.0	2.58	2580.0	-	No	P
2-6	100.0	2.58	2580.0	-	No	P
3-7	100.0	2.58	2580.0	-	No	P
4-5	100.0	2.58	2580.0	-	No	P
Supplementary information:						
Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² .						
Insulation tester can measure up to 100.0 GΩ.						

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12.25	Humidity-freeze test 1 – MST 52		
Total number of cycles		10	Result
Sample no.	Open circuits (yes/no)		
1-8	No		N/A
2-6	No		N/A
3-7	No		N/A
4-5	No		N/A
Supplementary information: N/A			

12.25.1	Visual inspection after Humidity-freeze test 1 – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-8	No major visual defects	No major visual defects	P
2-6	No major visual defects	No major visual defects	P
3-7	No major visual defects	No major visual defects	P
4-5	No major visual defects	No major visual defects	P
Supplementary information: N/A			

12.25.2	Insulation test after Humidity-freeze test 1 – MST 16					
Maximum system voltage [V _{DC}]		1500				Result
Cemented joints?		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes				
High voltage applied [V _{DC}]		8000				
Insulation resistance measured at [V _{DC}]		1500				
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		
				Yes (description)	No	
1-8	100.0	2.58	25800.0	-	No	
2-6	100.0	2.58	25800.0	-	No	
3-7	100.0	2.58	25800.0	-	No	
4-5	100.0	2.58	25800.0	-	No	
Supplementary information:						
Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² .						
Insulation tester can measure up to 100.0 GΩ.						

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12.26	Cold conditioning 2 – MST 55		
Temperature [°C]	-40 ± 3		Result
Duration [h]	48		
Sample no.	—		N/A
1-8	—		
2-6	—		
3-7	—		
4-5	—		
Supplementary information: N/A			

12.26.1	Visual inspection after Cold conditioning 2 – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-8	No major visual defects	No major visual defects	P
2-6	No major visual defects	No major visual defects	P
3-7	No major visual defects	No major visual defects	P
4-5	No major visual defects	No major visual defects	P
Supplementary information: N/A			

12.26.2	Insulation test after Cold conditioning 2 – MST 16					
Maximum system voltage [V _{DC}]	1500					Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]	8000					
Insulation resistance measured at [V _{DC}]	1500					
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		P
				Yes (description)	No	
1-8	100.0	2.58	25800.0	-	No	
2-6	100.0	2.58	25800.0	-	No	
3-7	100.0	2.58	25800.0	-	No	
4-5	100.0	2.58	25800.0	-	No	
Supplementary information:						
Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² .						
Insulation tester can measure up to 100.0 GΩ.						

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12.27	Humidity-freeze test 2 – MST 52		
Total number of cycles	10		Result
Sample no.	Open circuits (yes/no)		
1-8	No		N/A
2-6	No		N/A
3-7	No		N/A
4-5	No		N/A
Supplementary information: N/A			

12.27.1	Visual inspection after Humidity-freeze test 2 – MST 01		
Sample no.	Requirement	Nature and position of findings	Result
1-8	No major visual defects	No major visual defects	P
2-6	No major visual defects	No major visual defects	P
3-7	No major visual defects	No major visual defects	P
4-5	No major visual defects	No major visual defects	P
Supplementary information: N/A			

12.27.2	Insulation test after Humidity-freeze test 2 – MST 16					
Maximum system voltage [V _{DC}]	1500					Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes					
High voltage applied [V _{DC}]	8000					
Insulation resistance measured at [V _{DC}]	1500					
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		
				Yes (description)	No	
1-8	100.0	2.58	25800.0	-	No	
2-6	100.0	2.58	25800.0	-	No	
3-7	100.0	2.58	25800.0	-	No	
4-5	100.0	2.58	25800.0	-	No	
Supplementary information:						
Minimum requirement is 0.04 GΩ·m ² for A > 0.1 m ² and 0.4 GΩ for A ≤ 0.1 m ² .						
Insulation tester can measure up to 100.0 GΩ.						

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12.27.3	Wet leakage current test after Humidity-freeze test 2 – MST 17			
Maximum system voltage [V _{DC}]	1500			Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes			
Insulation resistance measured at [V _{DC}]	1500			
Solution resistivity [$\Omega \cdot \text{cm}$]	≤ 3500			
Solution temperature [°C]	22 ± 2			
Sample no.	R _{iso} [M Ω]	A [m ²]	R _{iso} ·A [M $\Omega \cdot \text{m}^2$]	
1-8	24300.0	2.58	62694.0	P
2-6	24300.0	2.58	63180.0	P
3-7	24100.0	2.58	62660.0	P
4-5	22700.0	2.58	58566.0	P
Supplementary information: Minimum requirement is 40 M $\Omega \cdot \text{m}^2$.				

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12.20 Insulation thickness test – MST 04

Sample no.	1-9			Result
Maximum system voltage [V]	1500			
Test location 1	Centre, near the junction box, between two busbars			
Test location 2	Edge cell, between two busbars			
Test location 3	Corner cell, above a busbar			
—	Test location 1	Test location 2	Test location 3	
Thickness layer 1 [µm]	23.3	25.5	24.0	
Thickness layer 2 [µm]	281.7	285.1	285.6	
Thickness layer 3 [µm]	10.8	10.3	11.8	
Total thickness [µm]	316	321	321	
Min. requirement [µm]	300			P

Supplementary information:

Min. requirement acc. to table 3/4 of IEC 61730-1.

Samples taken from positions as below (module view from backside):



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12.28	Cut susceptibility test – MST 12		
Applied force [N]		8.9 ± 0.5	Result
Sample no.	Test results		
1-3	No exposure of active circuitry of module		P
1-8	No exposure of active circuitry of module		P
1-9	No exposure of active circuitry of module		P
1-12	No exposure of active circuitry of module		P
2-2	No exposure of active circuitry of module		P
2-6	No exposure of active circuitry of module		P
2-7	No exposure of active circuitry of module		P
2-8	No exposure of active circuitry of module		P
3-3	No exposure of active circuitry of module		P
3-7	No exposure of active circuitry of module		P
3-8	No exposure of active circuitry of module		P
3-11	No exposure of active circuitry of module		P
4-2	No exposure of active circuitry of module		P
4-5	No exposure of active circuitry of module		P
4-6	No exposure of active circuitry of module		P
4-7	No exposure of active circuitry of module		P
5-2	No exposure of active circuitry of module		P
5-3	No exposure of active circuitry of module		P
Supplementary information: N/A			

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Sample no.	Requirement	Nature and position of findings	Result	
12.28.1	Visual inspection after Cut susceptibility test – MST 01			
1-3	No major visual defects	No major visual defects	P	
1-8		No major visual defects	P	
1-9		No major visual defects	P	
1-12		No major visual defects	P	
2-2		No major visual defects	P	
2-6		No major visual defects	P	
2-7		No major visual defects	P	
2-8		No major visual defects	P	
3-3		No major visual defects	P	
3-7		No major visual defects	P	
3-8		No major visual defects	P	
3-11		No major visual defects	P	
4-2		No major visual defects	P	
4-5		No major visual defects	P	
4-6		No major visual defects	P	
4-7		No major visual defects	P	
5-2		No major visual defects	P	
5-3		No major visual defects	P	
Supplementary information: N/A				

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12.28.2 Insulation test after Cut susceptibility test – MST 16

Maximum system voltage [V _{DC}]		1500		Result		
Cemented joints?		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes				
High voltage applied [V _{DC}]		8000				
Insulation resistance measured at [V _{DC}]		1500				
Sample no.	R _{iso} [GΩ]	A [m ²]	R _{iso} ·A [GΩ·m ²]	Dielectric breakdown		
				Yes (description)	No	
1-3	5.00	2.58	12.90	-	No	P
1-8	100.00	2.58	258.00	-	No	P
1-9	3.18	2.58	8.20	-	No	P
1-12	5.00	2.73	13.65	-	No	P
2-2	5.00	2.58	12.90	-	No	P
2-6	100.00	2.58	258.00	-	No	P
2-7	4.03	2.58	10.40	-	No	P
2-8	5.00	2.73	13.65	-	No	P
3-3	5.00	2.58	12.90	-	No	P
3-7	100.00	2.58	258.00	-	No	P
3-8	5.00	2.58	12.90	-	No	P
3-11	5.00	2.73	13.65	-	No	P
4-2	5.00	2.58	12.90	-	No	P
4-5	100.00	2.58	258.00	-	No	P
4-6	5.00	2.58	12.90	-	No	P
4-7	5.00	2.73	13.65	-	No	P
5-2	5.00	2.80	14.00	-	No	P
5-3	5.00	2.80	14.00	-	No	P

Supplementary information:
 Minimum requirement is 0.04 GΩ·m² for A > 0.1 m² and 0.4 GΩ for A ≤ 0.1 m².
 Insulation tester can measure up to 100.00 GΩ for sample No. 1-8, 2-6, 3-7 and 4-5.
 Insulation tester can measure up to 5.00 GΩ for others.

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12.28.3	Wet leakage current test after Cut susceptibility test – MST 17			
Maximum system voltage [V _{DC}]	1500			Result
Cemented joints?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes			
Insulation resistance measured at [V _{DC}]	1500			
Solution resistivity [Ω·cm]	≤ 3500			
Solution temperature [°C]	22 ± 2			
Sample no.	R _{iso} [MΩ]	A [m ²]	R _{iso} ·A [MΩ·m ²]	
1-3	2351.0	2.58	6065.6	P
1-8	24200.0	2.58	62436.0	P
1-9	3037.0	2.58	7835.5	P
1-12	3394.0	2.73	9265.6	P
2-2	2966.0	2.58	7652.3	P
2-6	23900.0	2.58	61662.0	P
2-7	1866.0	2.58	4814.3	P
2-8	3267.0	2.73	8918.9	P
3-3	2011.0	2.58	5188.4	P
3-7	23700.0	2.58	61146.0	P
3-8	1721.0	2.58	4440.2	P
3-11	2810.0	2.73	7671.3	P
4-2	3278.0	2.58	8457.2	P
4-5	21400.0	2.58	55212.0	P
4-6	2989.0	2.58	7711.6	P
4-7	2796.0	2.73	7633.1	P
5-2	5000.0	2.80	14000.0	P
5-3	5000.0	2.80	14000.0	P
Supplementary information: Minimum requirement is 40 MΩ·m ² .				

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12.29		Visual inspection (final) – MST 01	
Sample no.	Requirement	Nature and position of findings	Result
1-1	No major visual defects	No major visual defects	P
1-2		No major visual defects	P
1-3		No major visual defects	P
1-8		No major visual defects	P
1-9		No major visual defects	P
1-12		No major visual defects	P
2-1		No major visual defects	P
2-2		No major visual defects	P
2-5		No major visual defects	P
2-6		No major visual defects	P
2-7		No major visual defects	P
2-8		No major visual defects	P
3-1		No major visual defects	P
3-2		No major visual defects	P
3-3		No major visual defects	P
3-6		No major visual defects	P
3-7		No major visual defects	P
3-8		No major visual defects	P
3-11		No major visual defects	P
4-1		No major visual defects	P
4-2		No major visual defects	P
4-4		No major visual defects	P
4-5		No major visual defects	P
4-6		No major visual defects	P
4-7		No major visual defects	P
5-2		No major visual defects	P
5-3		No major visual defects	P

Supplementary information: N/A

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12.30	Accessibility test (final) – MST 11			
Applied force [N]	10			Result
Sample no.	Contact with live electrical part?	R _{iso} [MΩ]		
1-3	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0		P
1-8 (after MST 37)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0		P
1-8 (after B1 sequence)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0		P
1-9	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	50.0		P
1-12	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0		P
2-2	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	50.0		P
2-5	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	50.0		P
2-6 (after MST 37)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0		P
2-6 (after B1 sequence)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0		P
2-7	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	50.0		P
2-8	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0		P
3-3	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0		P
3-7 (after MST 37)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0		P
3-7 (after B1 sequence)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0		P
3-8	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	50.0		P
3-11	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0		P
4-2	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0		P
4-4	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	50.0		P
4-5 (after MST 37)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0		P
4-5 (after B1 sequence)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0		P
4-6	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	100.0		P

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4-7	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P
5-2	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P
5-3	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	60.0	P

Supplementary information:

The resistance tester can measure up to 100.0 MΩ for sample No. 1-8, 2-6, 3-7, 4-5 and 4-6.

The resistance tester can measure up to 60.0 MΩ for sample No. 1-3, 1-12, 2-8, 3-3, 3-11, 4-2, 4-7, 5-2 and 5-3.

The resistance tester can measure up to 50.0 MΩ for sample No. 1-9, 2-2, 2-5, 2-7, 3-8 and 4-4.

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12.31	Continuity test of equipotential bonding (final) – MST 13			
Maximum overcurrent protection rating [A]			25	Result
Current applied [A]			62.5	
Duration of applied current [min]			2	
Location of designated point for equipotential bonding			Long side of the frame	
No. of other conductive parts tested			3	
Sample no.	Max. measured voltage [mV]	Max. calculated resistance [mΩ]		
1-3	102.8	1.64		P
	114.0	1.82		
	200.6	3.21		
1-5	197.4	3.16		P
	213.2	3.41		
	183.3	2.93		
1-8 (after MST 37)	N/A	36.0		P
		37.0		
		37.0		
1-8 (after B1 sequence)	N/A	36.0		P
		37.0		
		37.0		
1-9	122.4	3.742		P
	113.3	1.813		
	83.7	1.339		
1-12	67.4	1.10		P
	54.3	0.87		
	73.2	1.17		
2-2	112.3	1.797		P
	96.4	1.542		
	73.3	1.173		
2-4	74.1	1.19		P
	68.6	1.20		
	62.7	1.00		
2-6 (after MST 37)	N/A	36.0		P
		37.0		
		37.0		
2-6 (after B1 sequence)	N/A	36.0		P
		37.0		
		37.0		
2-7	93.7	1.499		P

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	111.2 113.0	1.779 1.808	
2-8	44.2 91.3 65.1	1.51 1.46 1.23	P
3-3	138.6 115.7 126.9	2.22 1.85 2.03	P
3-7 (after MST 37)	N/A	34.0 36.0 36.0	P
3-7 (after B1 sequence)	N/A	36.0 37.0 37.0	P
3-8	124.0 117.2 113.4	1.984 1.875 1.814	P
3-11	555.8 540.3 480.2	8.89 8.64 7.68	P
4-2	77.4 75.8 59.6	1.24 1.21 0.95	P
4-5 (after MST 37)	N/A	36.0 37.0 37.0	P
4-5 (after B1 sequence)	N/A	36.0 37.0 37.0	P
4-6	93.7 112.0 122.2	1.499 1.792 1.955	P
4-7	557.8 559.3 477.7	8.92 8.95 7.64	P

Supplementary information: N/A

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12.32	Durability of markings – MST 05		
	Duration of rubbing with water [s]	15	Result
	Duration of rubbing with petroleum spirits [s]	15	
	Sample no.	Comments	
	1-1	The marking is legible; the marking plate is not removable and without curling.	P
	1-2	The marking is legible; the marking plate is not removable and without curling.	P
	1-3	The marking is legible; the marking plate is not removable and without curling.	P
	1-8	The marking is legible; the marking plate is not removable and without curling.	P
	1-9	The marking is legible; the marking plate is not removable and without curling.	P
	1-12	The marking is legible; the marking plate is not removable and without curling.	P
	2-1	The marking is legible; the marking plate is not removable and without curling.	P
	2-2	The marking is legible; the marking plate is not removable and without curling.	P
	2-6	The marking is legible; the marking plate is not removable and without curling.	P
	2-7	The marking is legible; the marking plate is not removable and without curling.	P
	2-8	The marking is legible; the marking plate is not removable and without curling.	P
	3-1	The marking is legible; the marking plate is not removable and without curling.	P
	3-2	The marking is legible; the marking plate is not removable and without curling.	P
	3-3	The marking is legible; the marking plate is not removable and without curling.	P
	3-7	The marking is legible; the marking plate is not removable and without curling.	P
	3-8	The marking is legible; the marking plate is not removable and without curling.	P
	3-11	The marking is legible; the marking plate is not removable and without curling.	P
	4-1	The marking is legible; the marking plate is not removable and without curling.	P
	4-2	The marking is legible; the marking plate is not removable and without curling.	P
	4-5	The marking is legible; the marking plate is not removable and without curling.	P
	4-6	The marking is legible; the marking plate is not removable and without curling.	P
	4-7	The marking is legible; the marking plate is not removable and without curling.	P
	5-1	The marking is legible; the marking plate is not removable and without curling.	P
	5-2	The marking is legible; the marking plate is not removable and without curling.	P
	5-3	The marking is legible; the marking plate is not removable and without curling.	P
Supplementary information: N/A			

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Absatz	Photovoltaic (PV) modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

12.33 Sharp edge test – MST 06		
Sample no.	Comments	Result
1-1	The accessible PV module surfaces are smooth and free from sharp edges.	P
1-2	The accessible PV module surfaces are smooth and free from sharp edges.	P
1-3	The accessible PV module surfaces are smooth and free from sharp edges.	P
1-8	The accessible PV module surfaces are smooth and free from sharp edges.	P
1-9	The accessible PV module surfaces are smooth and free from sharp edges.	P
1-12	The accessible PV module surfaces are smooth and free from sharp edges.	P
2-1	The accessible PV module surfaces are smooth and free from sharp edges.	P
2-2	The accessible PV module surfaces are smooth and free from sharp edges.	P
2-6	The accessible PV module surfaces are smooth and free from sharp edges.	P
2-7	The accessible PV module surfaces are smooth and free from sharp edges.	P
2-8	The accessible PV module surfaces are smooth and free from sharp edges.	P
3-1	The accessible PV module surfaces are smooth and free from sharp edges.	P
3-2	The accessible PV module surfaces are smooth and free from sharp edges.	P
3-3	The accessible PV module surfaces are smooth and free from sharp edges.	P
3-7	The accessible PV module surfaces are smooth and free from sharp edges.	P
3-8	The accessible PV module surfaces are smooth and free from sharp edges.	P
3-11	The accessible PV module surfaces are smooth and free from sharp edges.	P
4-1	The accessible PV module surfaces are smooth and free from sharp edges.	P
4-2	The accessible PV module surfaces are smooth and free from sharp edges.	P
4-5	The accessible PV module surfaces are smooth and free from sharp edges.	P
4-6	The accessible PV module surfaces are smooth and free from sharp edges.	P
4-7	The accessible PV module surfaces are smooth and free from sharp edges.	P
5-1	The accessible PV module surfaces are smooth and free from sharp edges.	P
5-2	The accessible PV module surfaces are smooth and free from sharp edges.	P
5-3	The accessible PV module surfaces are smooth and free from sharp edges.	P
Supplementary information: N/A		

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Absatz	Photovoltaic (PV) modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

12.34	Bypass diode functionality test (final) – MST 07			
Test method		<input type="checkbox"/> Method A	<input checked="" type="checkbox"/> Method B	Result
Sample no.	Diode 1	Diode 2	Diode 3	
1-1	working properly	working properly	working properly	P
1-2	working properly	working properly	working properly	P
1-3	working properly	working properly	working properly	P
1-8	working properly	working properly	working properly	P
1-9	working properly	working properly	working properly	P
1-12	working properly	working properly	working properly	P
2-1	working properly	working properly	working properly	P
2-2	working properly	working properly	working properly	P
2-6	working properly	working properly	working properly	P
2-7	working properly	working properly	working properly	P
2-8	working properly	working properly	working properly	P
3-1	working properly	working properly	working properly	P
3-2	working properly	working properly	working properly	P
3-3	working properly	working properly	working properly	P
3-7	working properly	working properly	working properly	P
3-8	working properly	working properly	working properly	P
3-11	working properly	working properly	working properly	P
4-1	working properly	working properly	working properly	P
4-2	working properly	working properly	working properly	P
4-5	working properly	working properly	working properly	P
4-6	working properly	working properly	working properly	P
4-7	working properly	working properly	working properly	P
5-1	working properly	working properly	working properly	P
5-2	working properly	working properly	working properly	P
5-3	working properly	working properly	working properly	P
Supplementary information:				
This test verifies that the sample shows the electrical characteristics of a functional photovoltaic device.				

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Absatz	Photovoltaic (PV) modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

12.36	Fire test – MST 23		
12.36.1	Spread of flame test		
Sample no.	1-10		
Fire class test specification	C		
Test results			
Did any portion of the module blow off or fall off the test deck in the form of flaming / glowing brands?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	P
Did any portion of the roof desk fall away in the form of glowing particles?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Was the flame spread beyond 1.82m for Class A, 2.40m for Class B or 3.96m for Class C?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Was there a significant lateral spread-of-flame from the path directly exposed to the test flame?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
12.36.2	Burning brand test		
Sample no.	1-11		
Fire class test specification	C		
Test results			
Did any portion of the module blow off or fall off the test deck in the form of flaming / glowing brands?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	P
Did any portion of the roof desk fall away in the form of glowing particles?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Did the brand burn a hole through the roof covering or through any part of the module?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Did any sustained flaming of the module occur?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Supplementary information: The Fire Test (MST 23) was performed based on ANSI/UL 790: Standard Test Methods for Fire Tests of Roof Coverings.			

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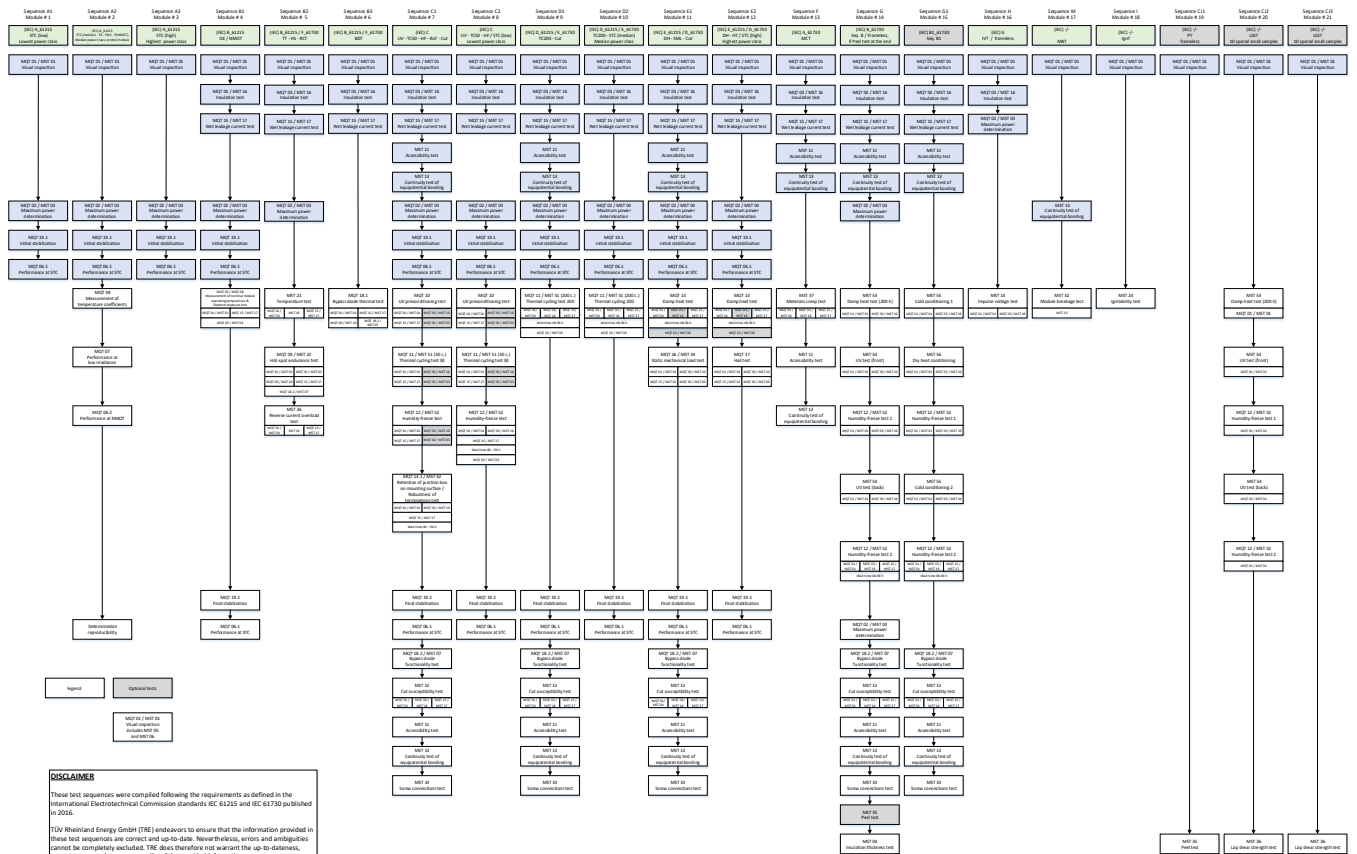
Absatz	Photovoltaic (PV) modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

12.36	Fire test – MST 23		
12.36.1	Spread of flame test		
Sample no.	3-9		
Fire class test specification	C		
Test results			
Did any portion of the module blow off or fall off the test deck in the form of flaming / glowing brands?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	P
Did any portion of the roof deck fall away in the form of glowing particles?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Was the flame spread beyond 1.82m for Class A, 2.40m for Class B or 3.96m for Class C?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Was there a significant lateral spread-of-flame from the path directly exposed to the test flame?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
12.36.2	Burning brand test		
Sample no.	3-10		
Fire class test specification	C		
Test results			
Did any portion of the module blow off or fall off the test deck in the form of flaming / glowing brands?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	P
Did any portion of the roof deck fall away in the form of glowing particles?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Did the brand burn a hole through the roof covering or through any part of the module?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Did any sustained flaming of the module occur?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Supplementary information: The Fire Test (MST 23) was performed based on ANSI/UL 790: Standard Test Methods for Fire Tests of Roof Coverings.			

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Appendix A: Test charts



DISCLAIMER
These test sequences were compiled following the requirements as defined in the International Electrotechnical Commission standard: IEC 61215 and IEC 61730 published in 2016.
TUV Rheinland Energy GmbH (TRE) endeavors to ensure that the information provided in these test sequences are correct and up-to-date. Nevertheless, errors and ambiguities (cannot be completely excluded). TRE does therefore not warrant the up-to-dateness, correctness, completeness or quality of the provided information.
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Appendix B: Abbreviations used in the report

NMOT	Nominal Module Operating Temperature
STC	Standard Test Conditions
P_{max}	Maximum power
I_{mpp}	Maximum power point current
V_{mpp}	Maximum power point voltage
I_{sc}	Short circuit current
V_{oc}	Open circuit voltage
FF	Fill factor
α	Current temperature coefficient
β	Voltage temperature coefficient
γ	Power temperature coefficient
S	Series connection
SP	Series-parallel connection
PS	Parallel-series connection
R_{iso}	Electrical insulation resistance
A	Module area

Statement of the estimated uncertainty of the test verdicts

- Electrical performance rating is outside the scope of IEC 61215:2016 qualification testing. The verdicts of performance rating are only related to the test samples that were subjected to the tests. They cannot be generalised to the modules from the series production.
- The calibration to STC was performed with a class AAA solar simulator. The extended measurement uncertainty is:
 - o $2\sigma (P_{mpp}) \leq \pm 3.0 \%$
 - o $2\sigma (I_{sc}) \leq \pm 2.8 \%$
 - o $2\sigma (V_{oc}) \leq \pm 0.9 \%$
- The reproducibility parameter r with the solar simulator is 0.8 %.
- Relative measurements were performed with a flash type solar simulator.

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Appendix C: History of reporting and certification

Subject	Module type	Report no.	Certificate no.	Date of issue
Basic qualification IEC 61215 and IEC 61730	Refer to certificate PV 50416412 Page 1-2	50173415 001	PV 50416412 Page 1-2	18/09/2018
Extension of IEC 61215 and IEC 61730	Same as above	50173415 002	Declaration	27/09/2018
Extension of IEC 61215 and IEC 61730	Extension of certificate PV 50416412 Page 3	50173415 003	PV 50416412 Page 3	28/01/2019
Extension of IEC 61215 and IEC 61730	Same as above	50173415 004	Declaration	04/03/2019
Extension of IEC 61215 and IEC 61730	Extension of certificate PV 50416412 Page 4	50173415 005	PV 50416412 Page 4	10/06/2019
Extension of IEC 61215 and IEC 61730	Same as above	50173415 006	Declaration	18/07/2019
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	Extension of certificate PV 50416412 Page 5-7	50173415 007	PV 50416412 Page 5-7	02/08/2019
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	Extension of certificate PV 50416412 Page 5-7	50173415 008	PV 50416412 Page 8	11/09/2019
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	Co-license	50173415 009	PV50446385 page 1-2	11/09/2019
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	Extension of certificate PV 50416412 Page 9	50173415 010	PV 50416412 Page 9	29/09/2019
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	Extension of certificate PV 50416412 Page 10	50173415 011	PV 50416412 Page 10	12/10/2019
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	Extension of certificate PV 50416412 Page 11	50173415 012	PV 50416412 Page 11	06/12/2019
CE	AN 50456185 Page 1-5	50173415 013	AN 50456185 Page 1-5	29/12/2019
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 12-13	50173415 014	PV 50416412 Page 12-13	02/01/2020
Co-license	PV 50456017 Page 1	50173415 015	PV 50456017 Page 1	17/01/2020
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 14	50173415 016	PV 50416412 Page 14	12/02/2020

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Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 15-16	50173415 017	PV 50416412 Page 15-16	17/02/2020
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 17	50173415 018	PV 50416412 Page 17	10/04/2020
CE	AN 50463221 Page 1 - 3	50173415 019	AN 50463221 Page 1 - 3	10/04/2020
Co-license	PV 50463675 Page 1-2	50173415 020	PV 50463675 Page 1-2	13/04/2020
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 18	50173415 021	PV 50416412 Page 18	07/05/2020
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 19-20	50173415 022	PV 50416412 Page 19-20	05/06/2020
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412_50173415 21-24	50173415 023	PV 50416412_50173415 21-24	12/06/2020
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 25_50173415 024	50173415 024	PV 50416412 Page 25	01/07/2020
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 26-028_50173415 025	50173415 025	PV 50416412 Page 26-028	15/07/2020
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 29 - 30_50173415 026	50173415 026	PV 50416412 Page 29 - 30	20/08/2020
Co-license	PV 50456702 Page 2_50173415 027	50173415 027	PV 50456702 Page 2	25/08/2020
CE	AN 50477784 Page 1 – 14_50173415 028	50173415 028	AN 50477784 Page 1 – 14	08/09/2020
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 31 - 32	50173415 029	PV 50416412 Page 31 - 32	11/09/2020
CE	AN 50483976 Page 1 - 4	50173415 030	AN 50483976 Page 1 - 4	28/10/2020
Co-license cover page	-	50173415 031	-	-
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 33 - 36	50173415 032	PV 50416412 Page 33 - 36	30/11/2020

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Co-license	-	50173415 033	-	03/12/2020
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 37 - 44	50173415 034	PV 50416412 Page 37 - 44	30/12/2020
CE	AN 50492274 Page 1 - 17	50173415 035	AN 50492274 Page 1 - 17	15/01/2021
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 45 -46	50173415 036	PV 50416412 Page 45 -46	09/02/2021
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 47-51	50173415 037	PV 50416412 Page 47-51	16/03/2021
UKCA	AQ 50498486 Page 1 - 26	50173415 038	AQ 50498486 Page 1 - 26	09/04/2021
Co-license	PV 50456702 page 3	50173415 039	PV 50456702 page 3	09/04/2021
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 1	50173415 040	PV 50416412 Page 1	26/04/2021
CE	AN 50506529 Page 1 - 7	50173415 041	AN 50506529 Page 1 - 7	03/06/2021
Co-license	PV 50446385 Page 3	50173415 042	PV 50446385 Page 3	27/05/2021
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 52	50173415 043	PV 50416412 Page 52	21/06/2021
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 53	50173415 044	PV 50416412 Page 53	20/07/2021
UKCA	AQ 50514141 Page 1 - 2	50173415 045	AQ 50514141 Page 1 - 2	16/08/2021
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 54 - 56	50173415 046	PV 50416412 Page 54 - 56	07/09/2021
CE	AN 50521032 Page 1-3	50173415 047	AN 50521032 Page 1-3	22/10/2021
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50394835 Page 70 - 71	50173415 048	PV 50394835 Page 70 - 71	26/10/2021
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 58	50173415 049	PV 50416412 Page 58	11/11/2021
UKCA	AQ 50525412 Page 1 - 5	50173415 050	AQ 50525412 Page 1 - 5	23/11/2021
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 58	50173415 051	PV 50416412 Page 58	06/12/2021
CE	AN 50527734 Page 1 - 5	50173415 052	AN 50527734 Page 1 - 5	20/12/2021
Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 60	50173415 053	PV 50416412 Page 60	24/12/2021

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Extension of IEC 61215, IEC 61730, EN 61215, EN IEC 61730	PV 50416412 Page 61	50173415 054	PV 50416412 Page 61	31/12/2021
Co-license	PV 50531563 Page 1	50173415 055	PV 50531563 Page 1	24/01/2022

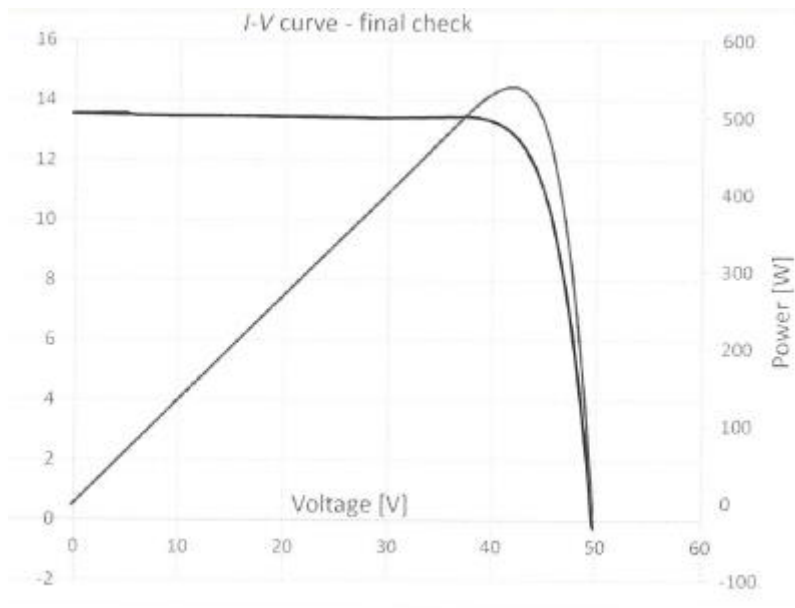
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Appendix D: Measurement reports

Module type: JKM550M-72HL4-V (Median power) (BOM1)
SN: 63xx20210819110536430001

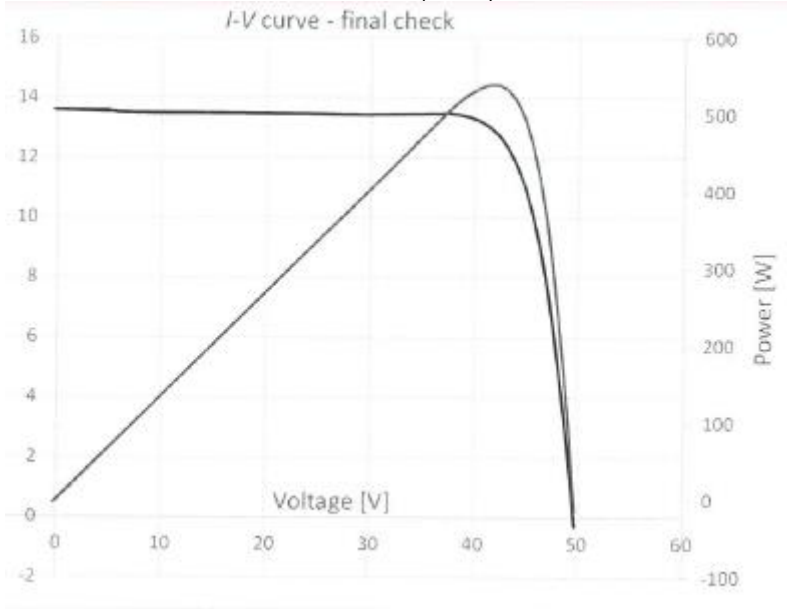


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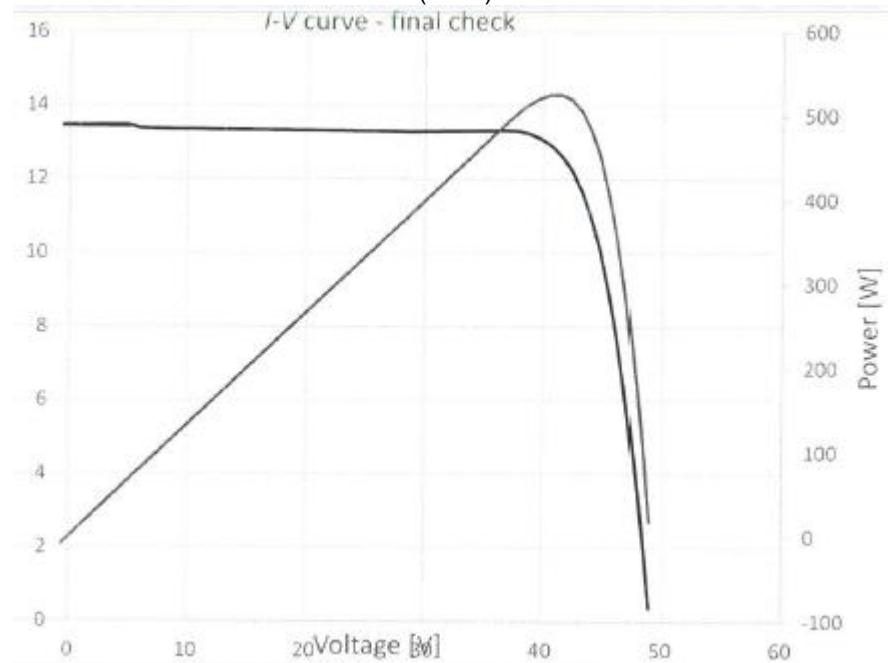
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SN: 63xx20210819110536430009 (Initial)



SN: 63xx20210819110536430009 (Final)

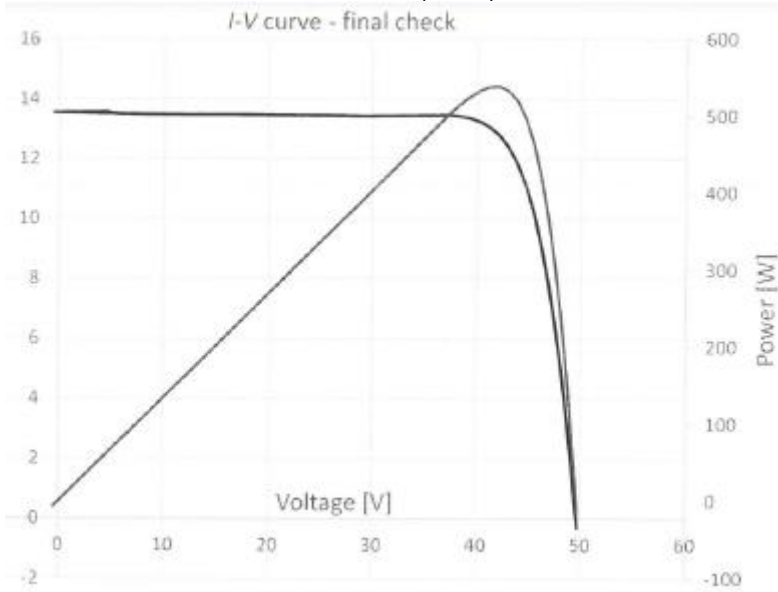


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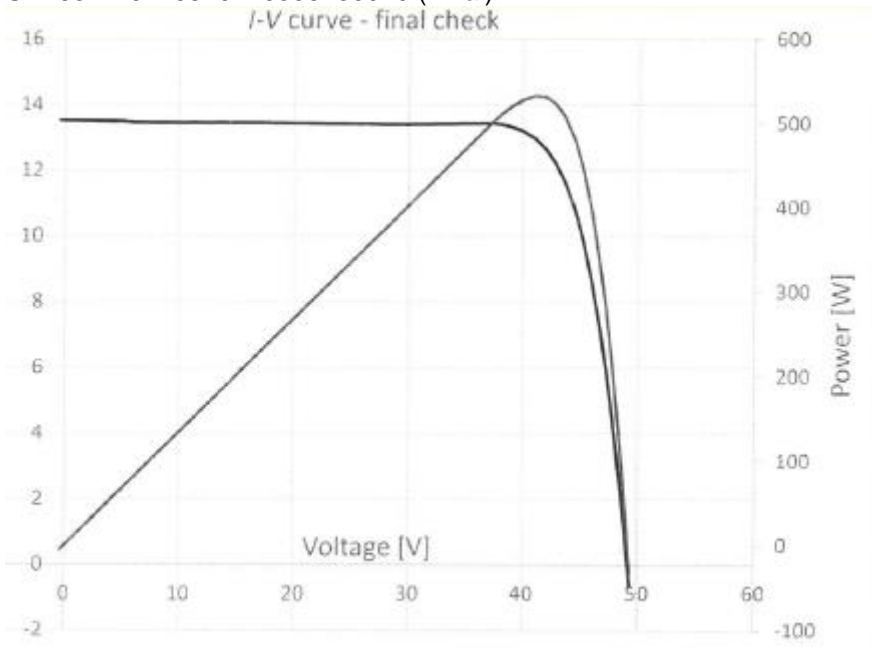
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ZUSATZ-DOKUMENTATION
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SN: 63xx20210819110536430010 (Initial)



SN: 63xx20210819110536430010 (Final)

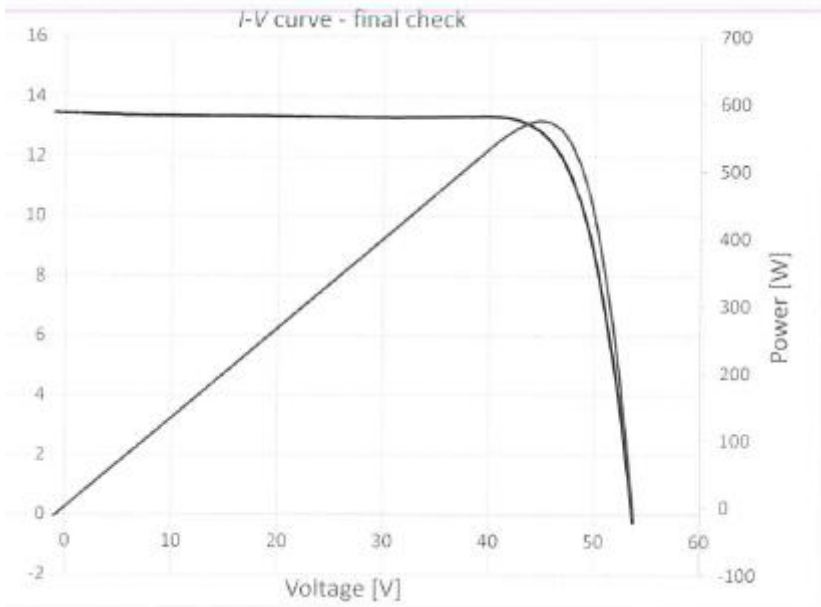


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APPENDIX to test report no.:

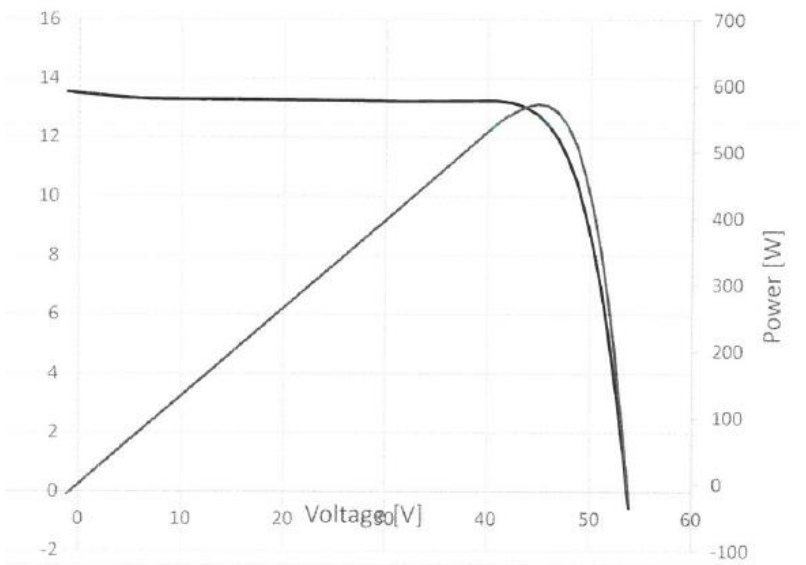
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Module type: JKM570M-7RL4-V (Median power) (BOM1)
SN: 82XX20210819110536440001 (Initial)



SN: 82XX20210819110536440001 (Final)
I-V curve - final check

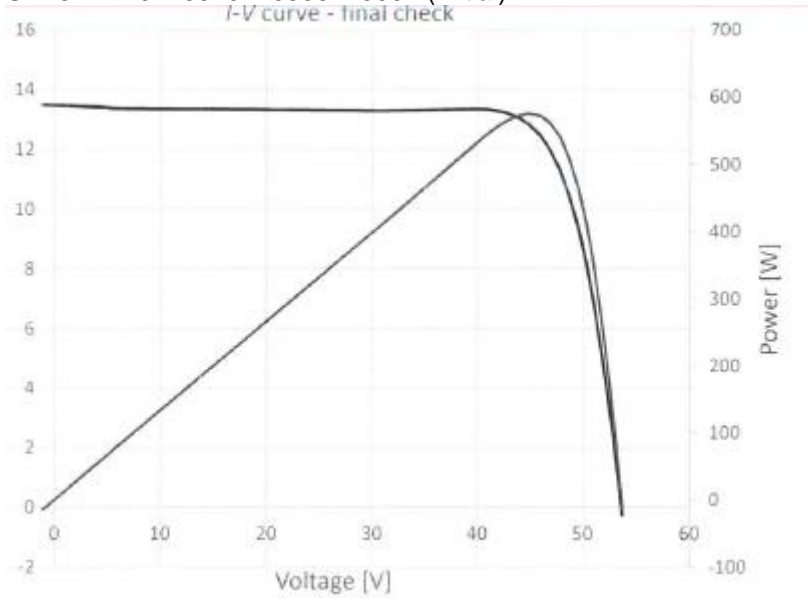


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APPENDIX to test report no.:

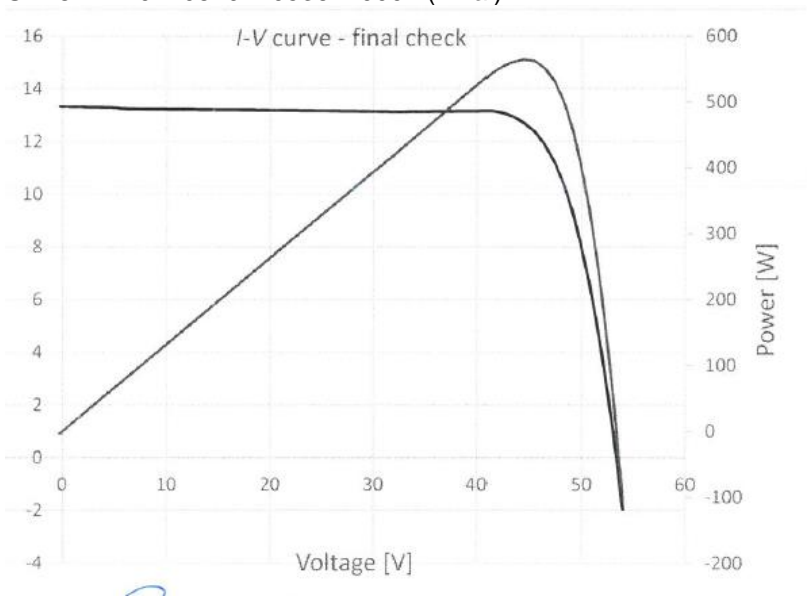
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SN: 82XX20210819110536440002 (Initial)



SN: 82XX20210819110536440002 (Final)

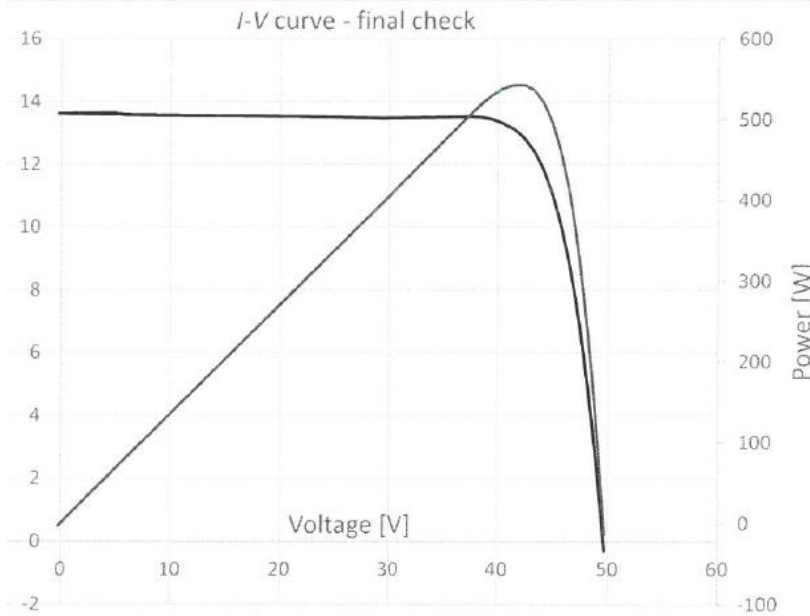


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Module type: JKM550M-72HL4-V (Median power) (BOM2)
SN: 63xx20210819110536420008

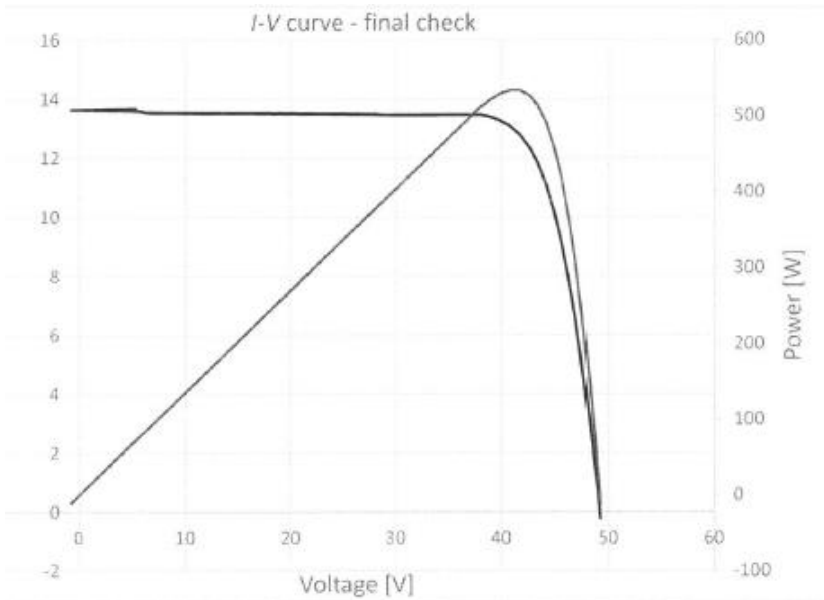


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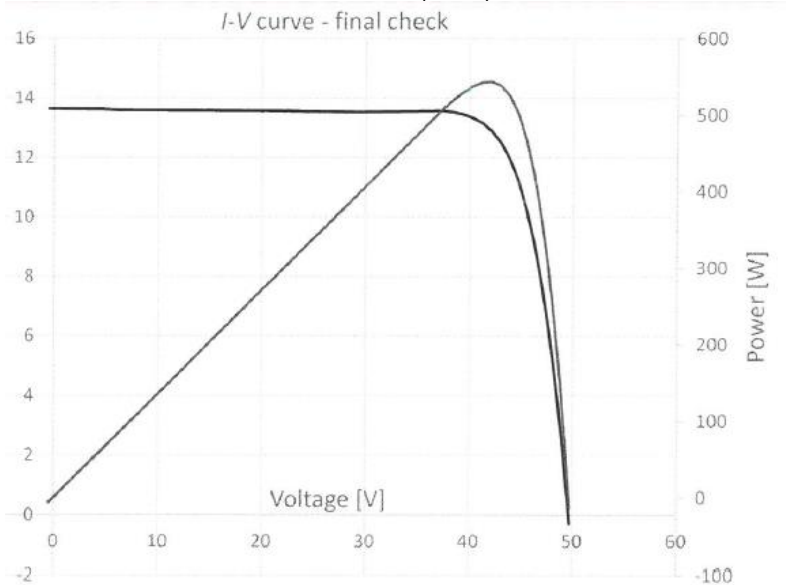
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

SN: 63xx20210819110536420009 (Initial)



SN: 63xx20210819110536420009 (Final)

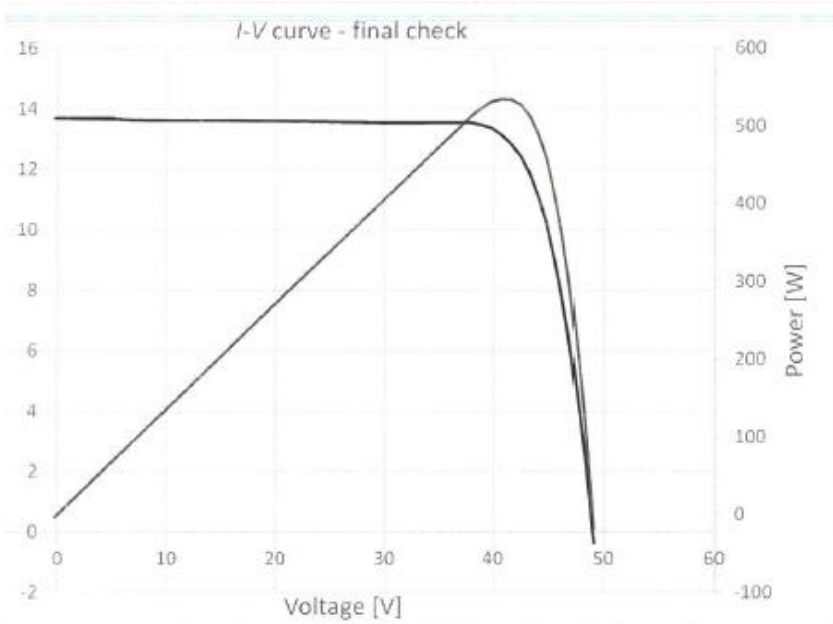


ANLAGE zum Prüfbericht-Nr.: 50173415 056
APPENDIX to test report no.:

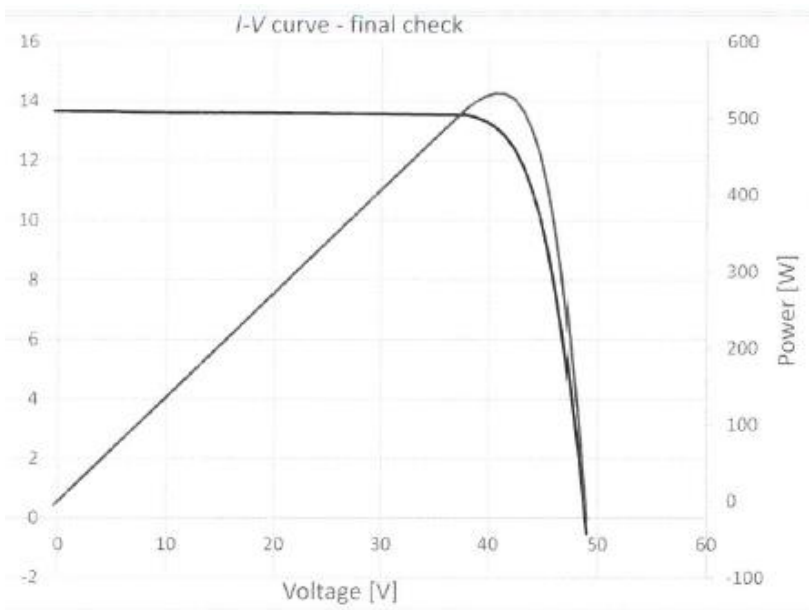
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

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SN: 63xx20210819110536420010 (Final)

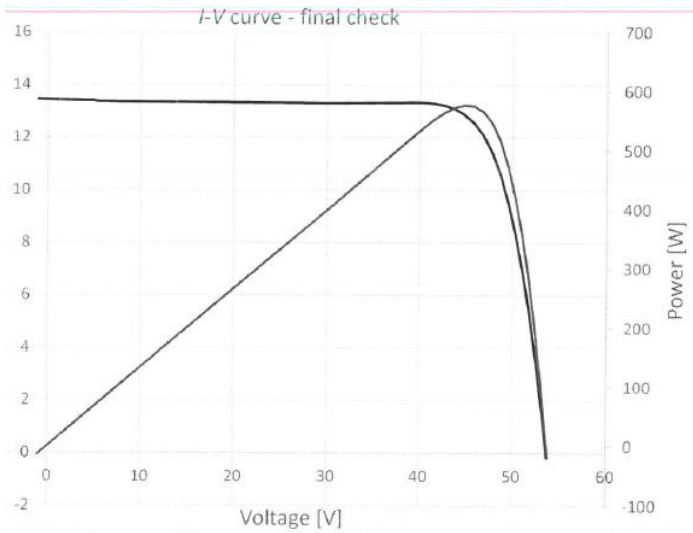


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APPENDIX to test report no.:

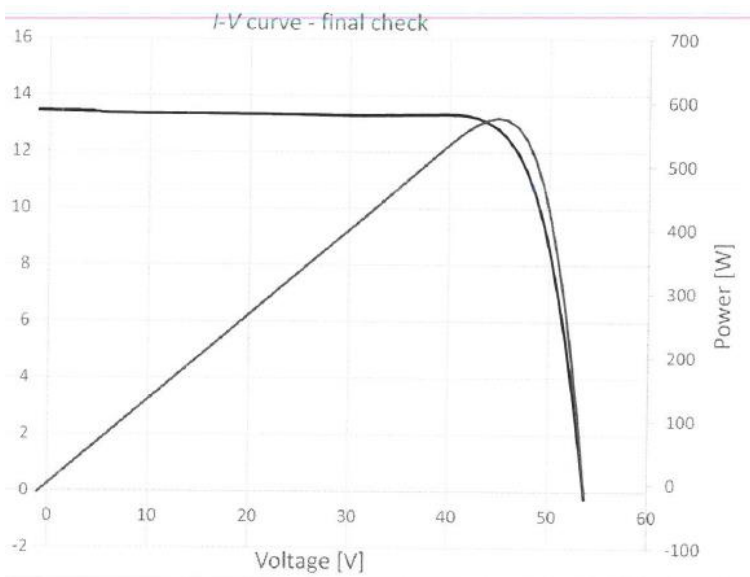
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SN: 82XX20210819110536440004(Final)

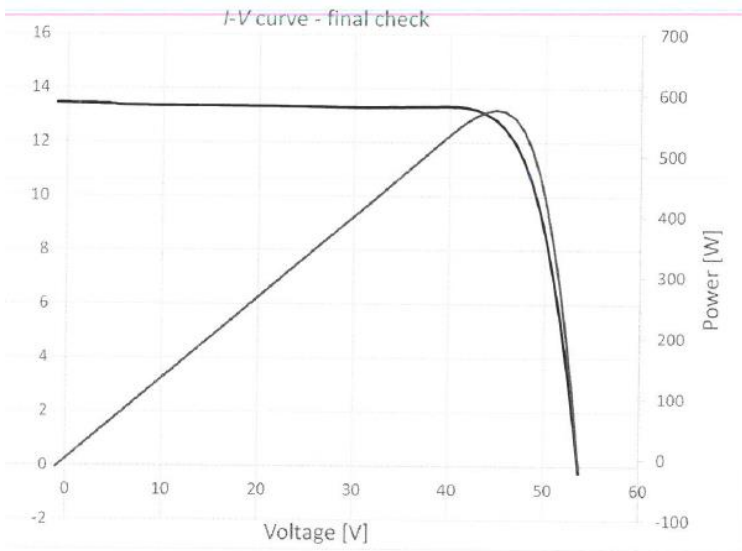


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APPENDIX to test report no.:

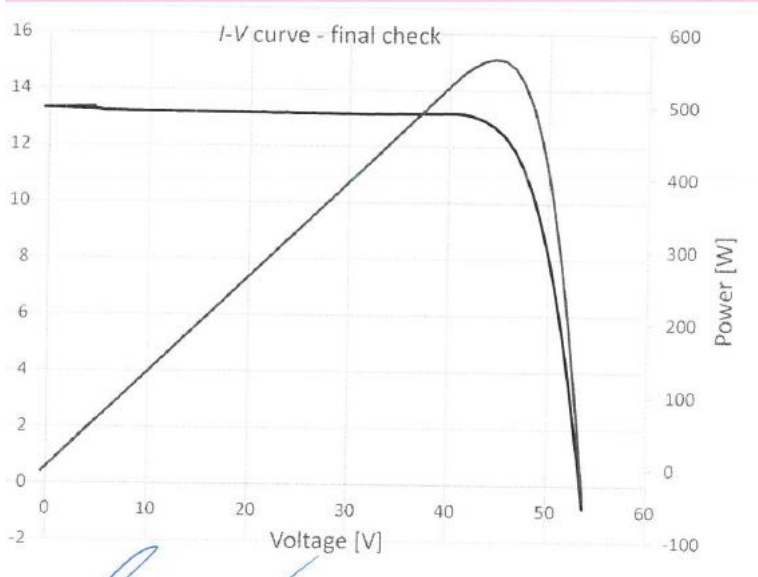
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

SN: 82XX20210819110536440005 (Initial)



SN: 82XX20210819110536440005 (Final)



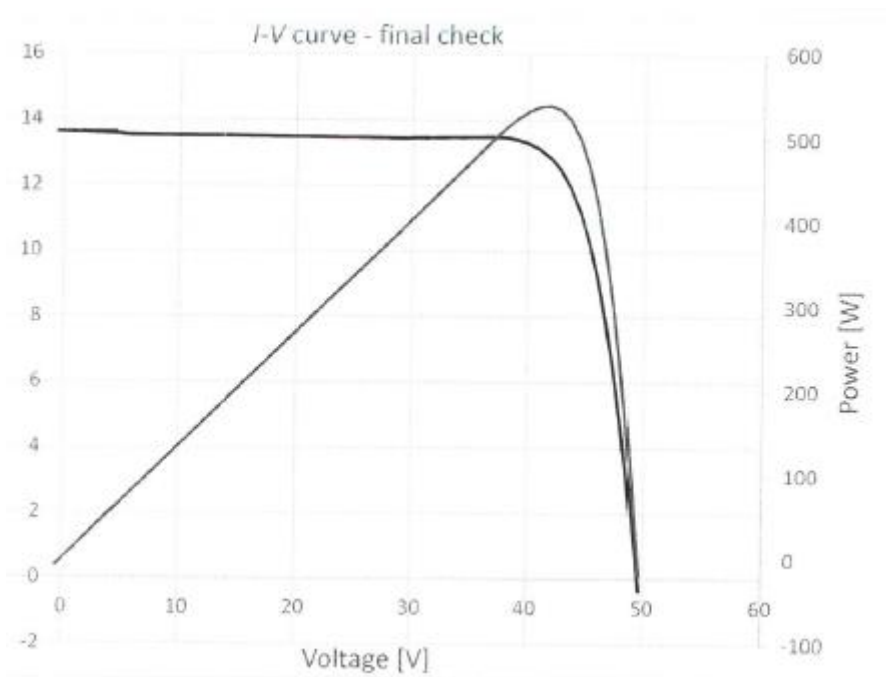
ANLAGE zum Prüfbericht-Nr.: 50173415 056
APPENDIX to test report no.:

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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

Module type: JKM550M-72HL4-V (Median power) (BOM3)

SN: 63xx20210819110536400002

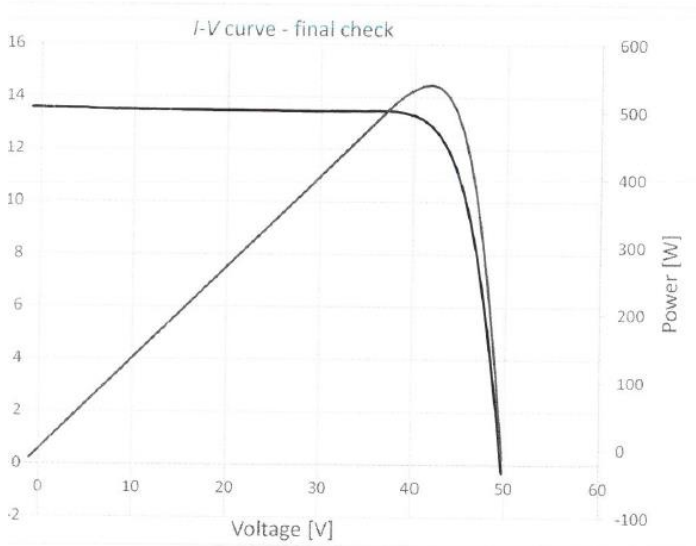


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APPENDIX to test report no.:

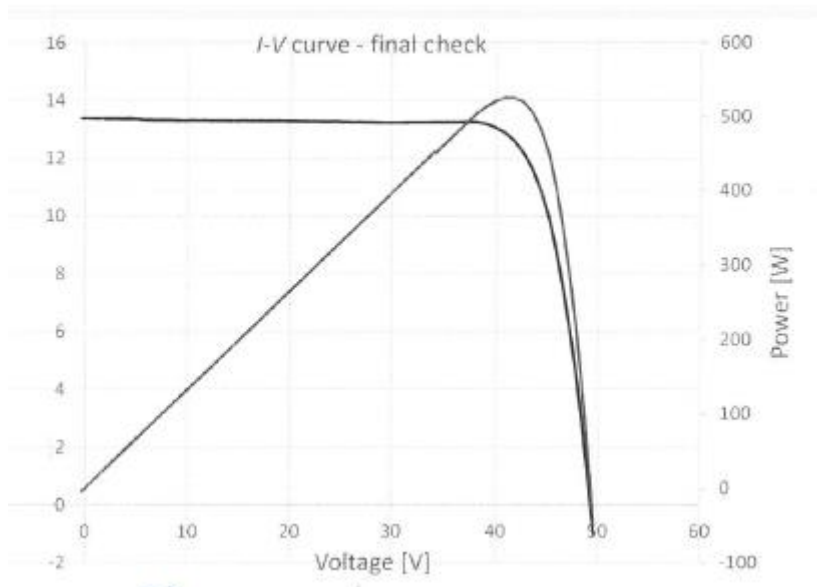
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ADDITIONAL DOCUMENTATION

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SN: 63xx20210819110536400008 (Final)

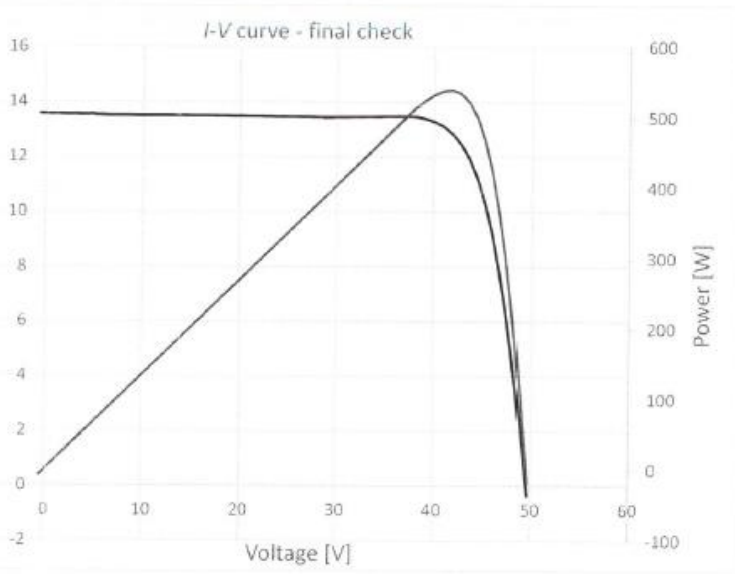


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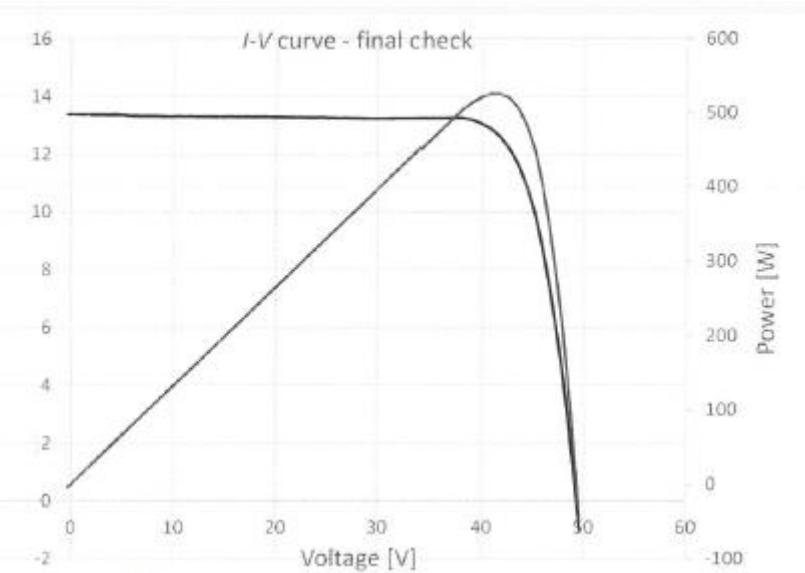
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

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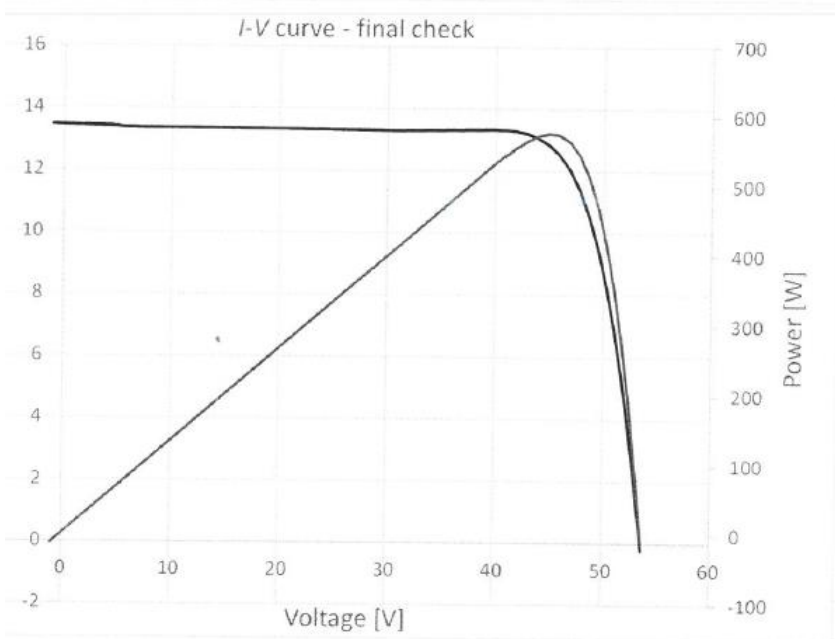


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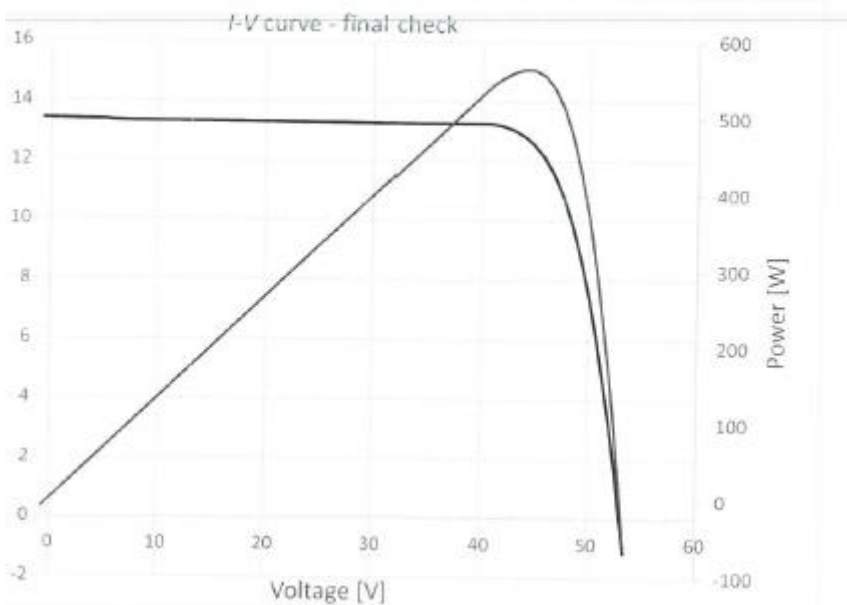
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

Module type: JKM570M-7RL4-V (Median power) (BOM3)
SN: 82XX20210819110536440006 (Initial)



SN: 82XX20210819110536440006 (Final)

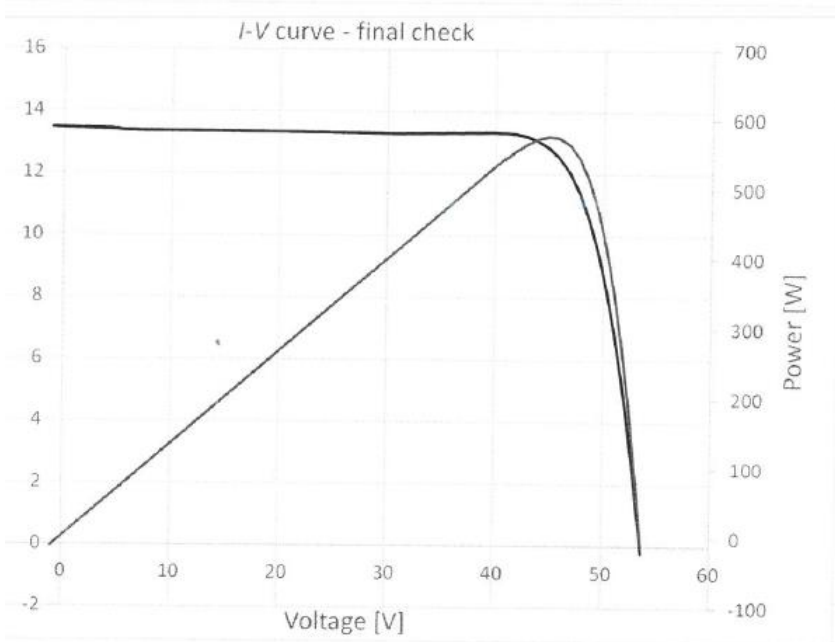


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APPENDIX to test report no.:

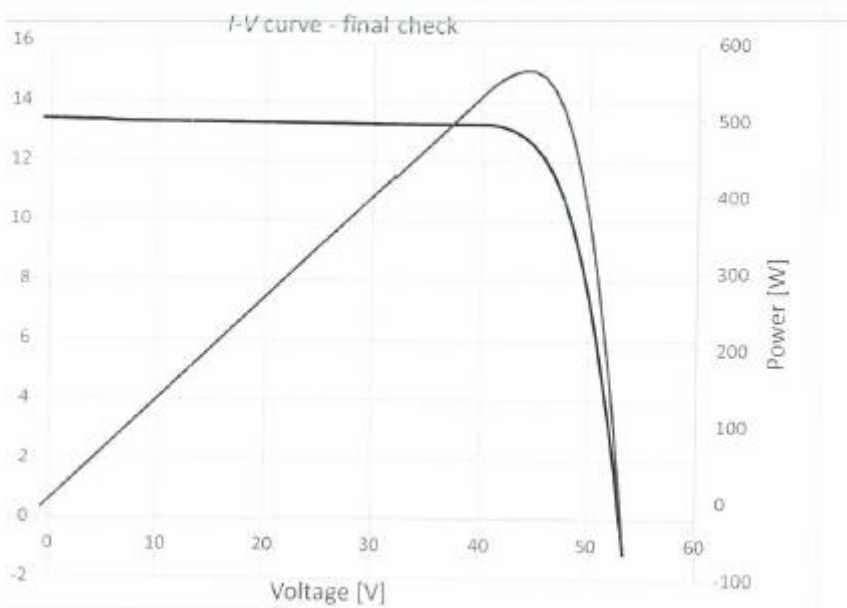
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

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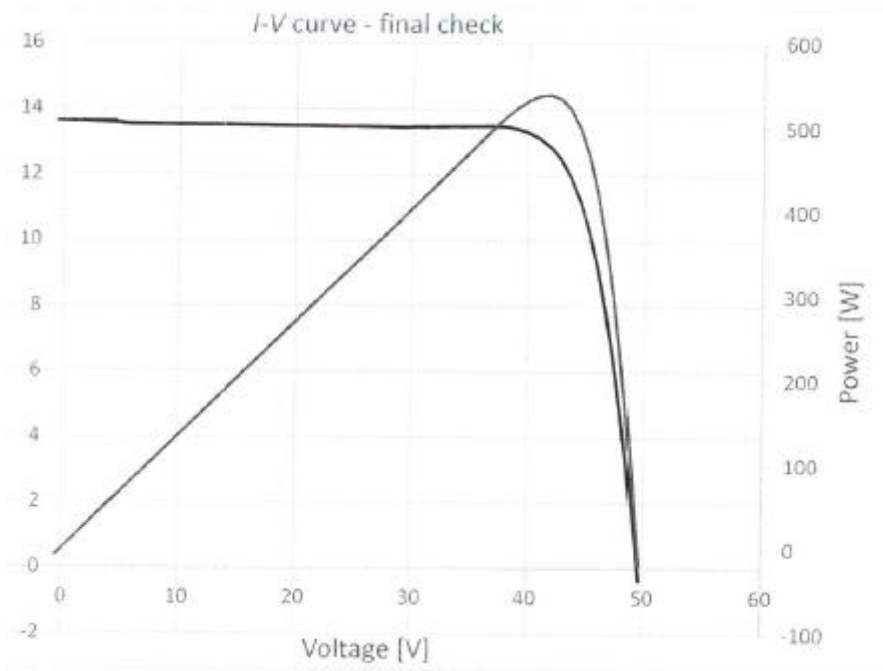


ANLAGE zum Prüfbericht-Nr.: 50173415 056
APPENDIX to test report no.:

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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

Module type: JKM550M-72HL4-V (Median power) (BOM4)
SN: 63xx20210819110536410002

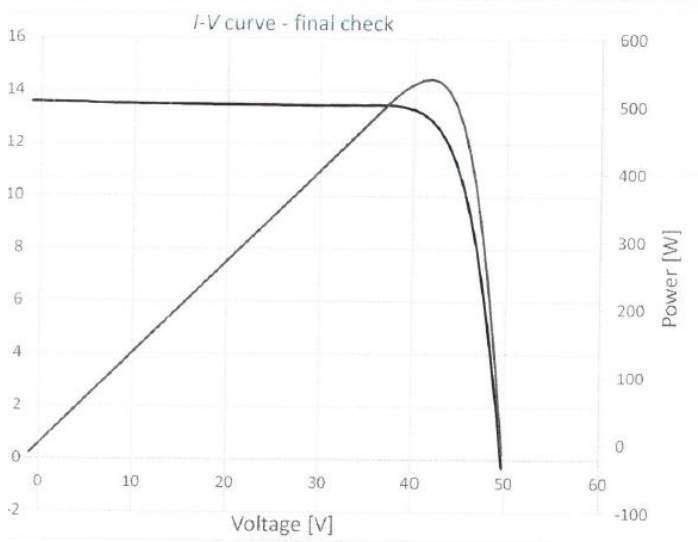


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APPENDIX to test report no.:

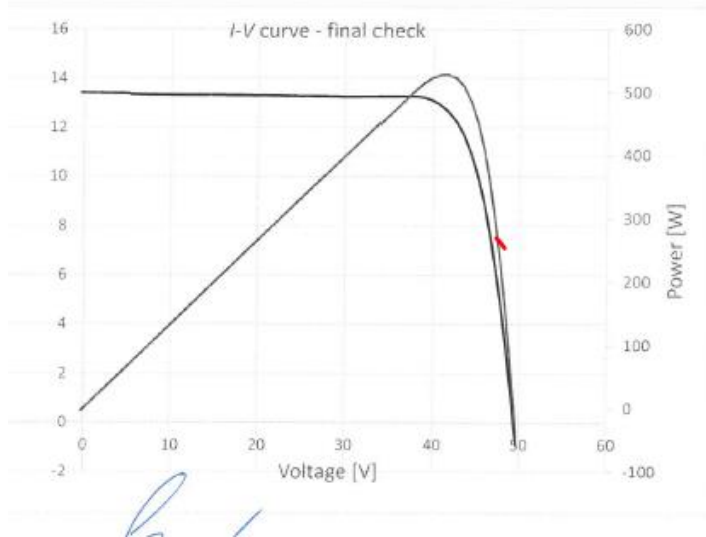
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

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SN: 63xx20210819110536410003 (Final)

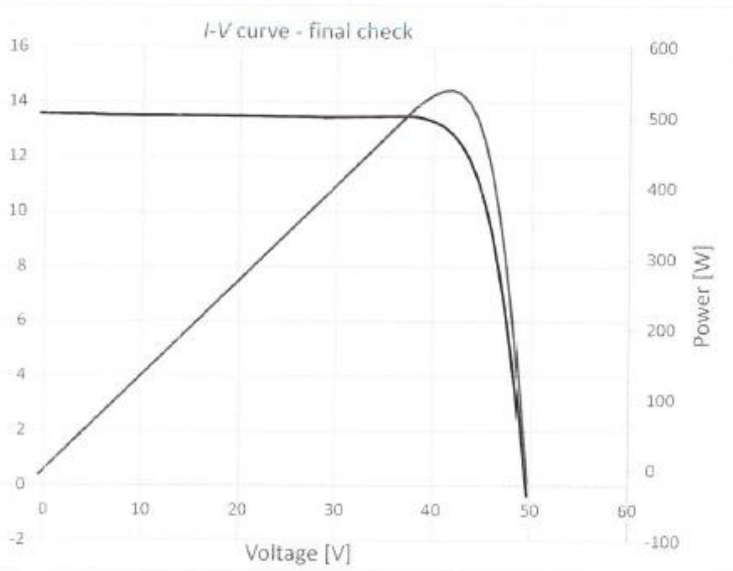


ANLAGE zum Prüfbericht-Nr.: 50173415 056
APPENDIX to test report no.:

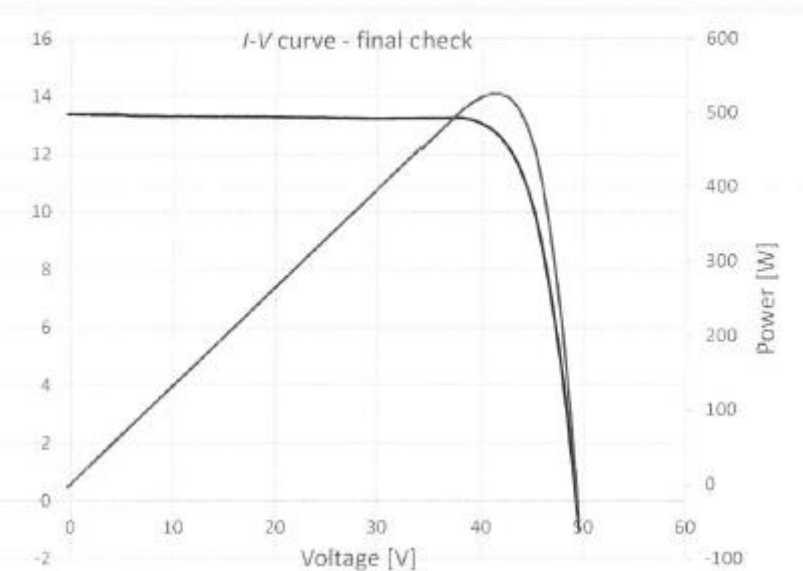
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

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SN: 63xx20210819110536410004 (Final)

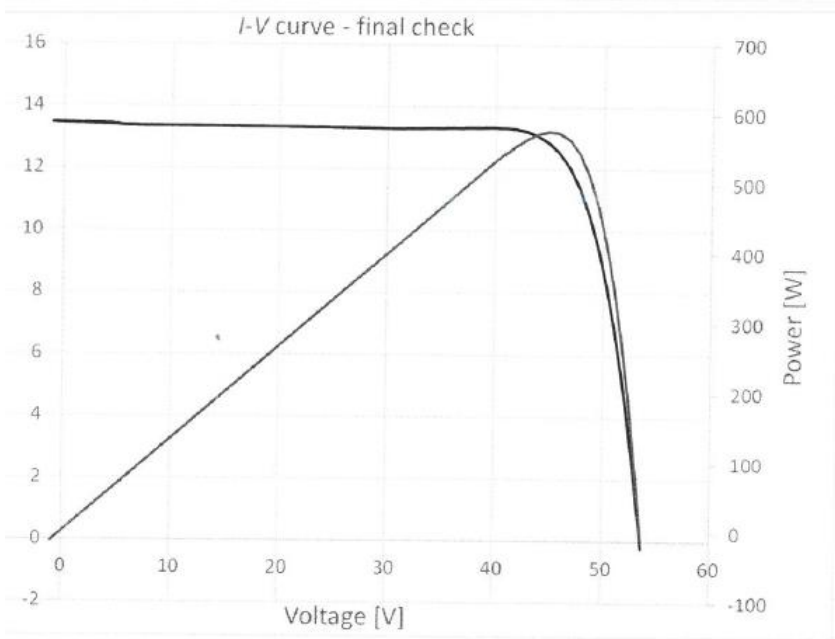


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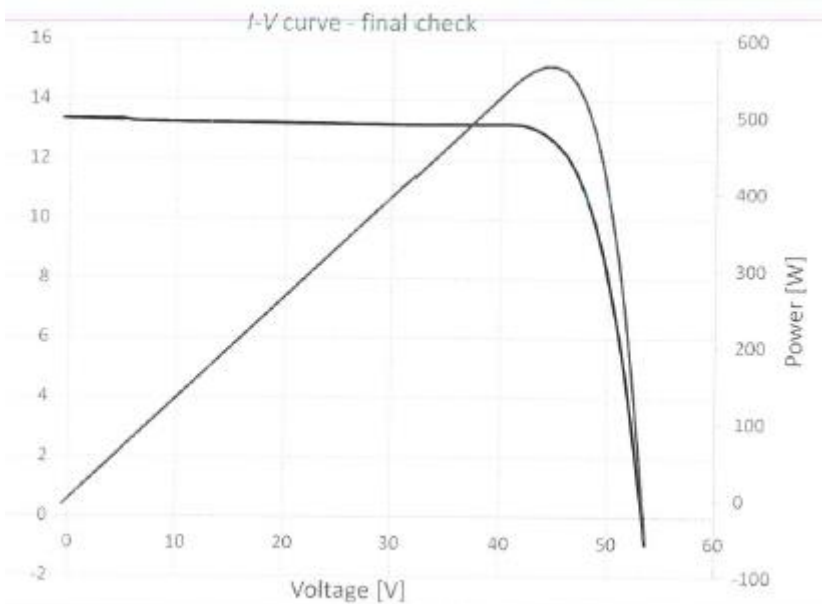
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

Module type: JKM570M-7RL4-V (Median power) (BOM4)
SN: 82XX20210819110536440008 (Initial)



SN: 82XX20210819110536440008 (Final)

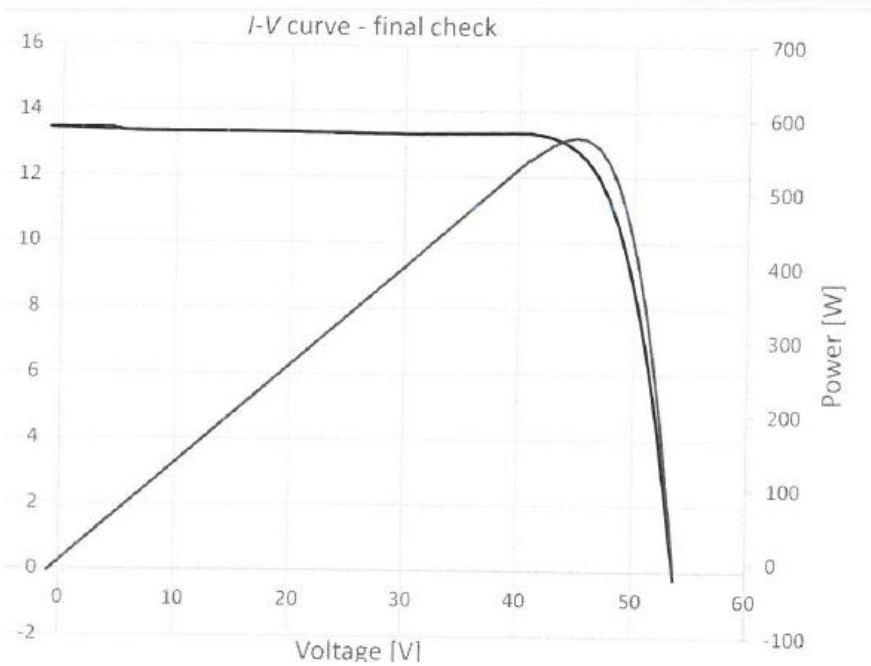


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APPENDIX to test report no.:

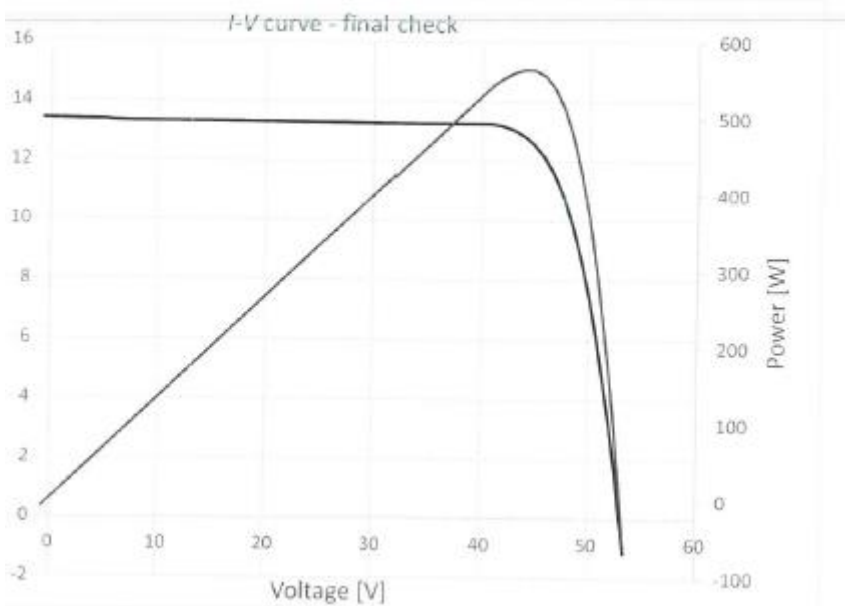
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

SN: 82XX20210819110536440009 (Initial)



SN: 82XX20210819110536440009 (Final)

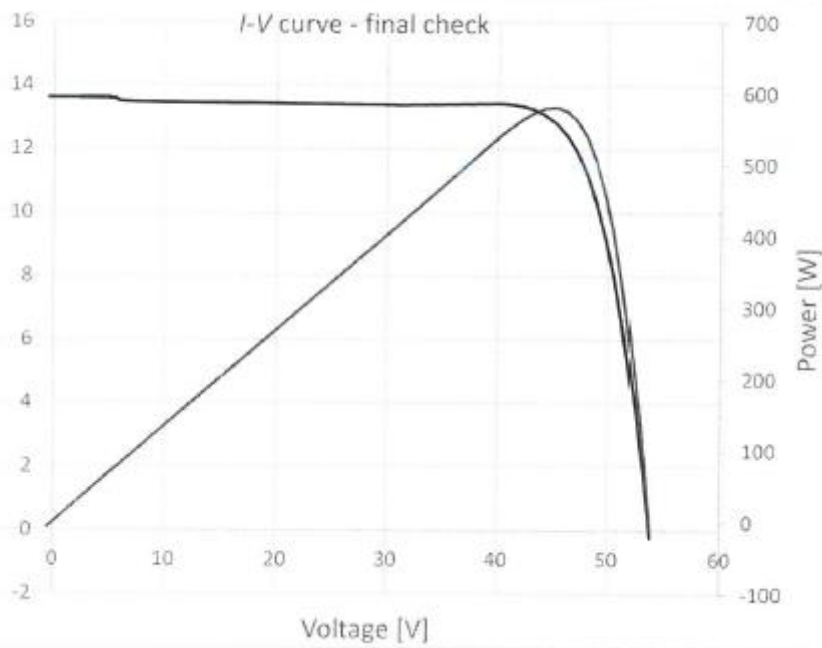


ANLAGE zum Prüfbericht-Nr.: 50173415 056
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

Module type: JKM580M-78HL4-TV (Median power) (BOM5)
SN: 62XX20211027110545700032

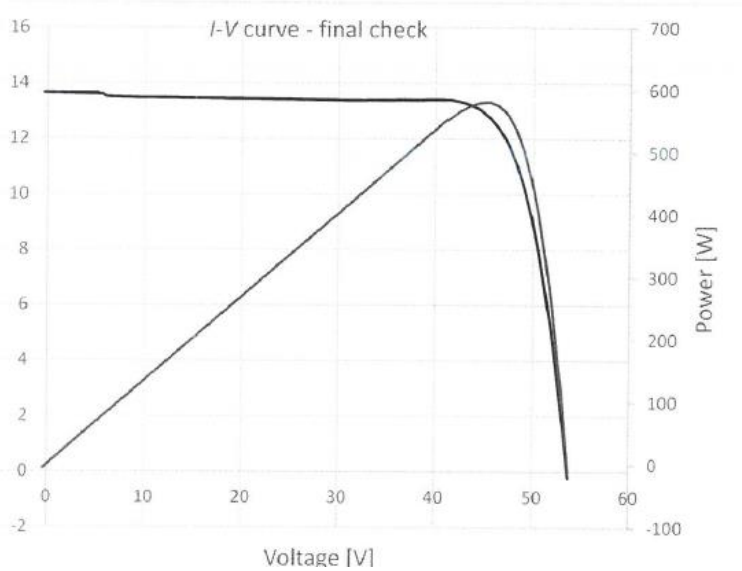


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APPENDIX to test report no.:

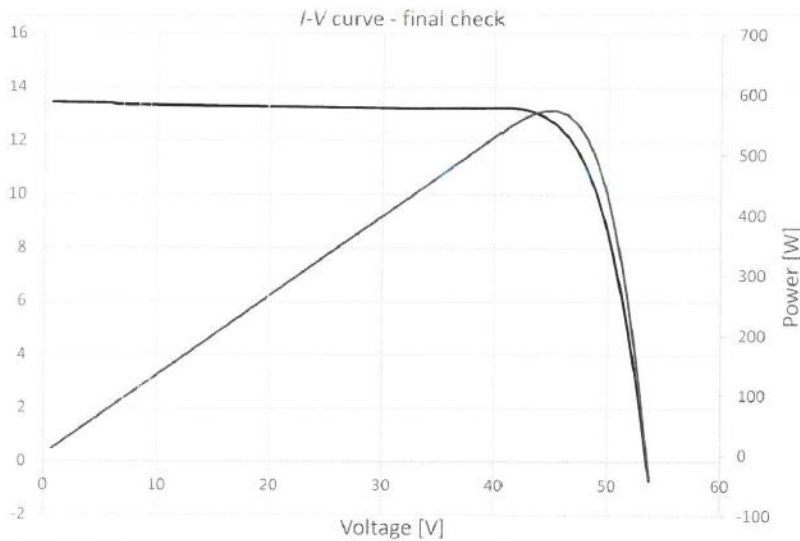
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

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SN: 62XX20211027110545700033 (Final)

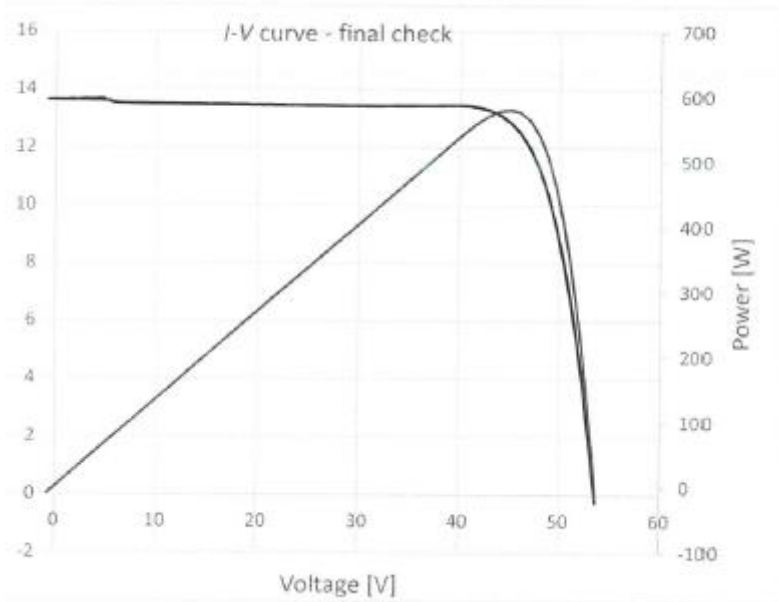


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APPENDIX to test report no.:

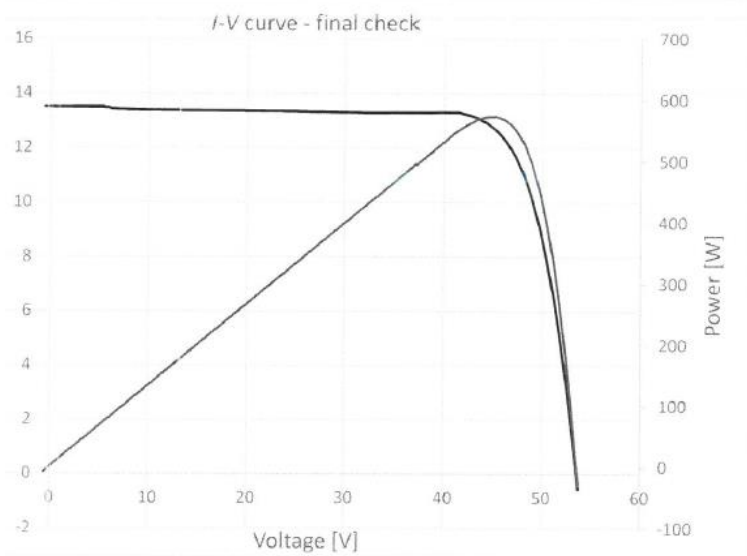
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

SN: 62XX20211027110545700021 (Initial)



SN: 62XX20211027110545700021 (Final)



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ADDITIONAL DOCUMENTATION

Appendix E: Declaration



晶科能源
www.jinkosolar.com

中国上海浦东新区杨高南路
428号2号楼16层
200127
16F, Building No. 2,
428# South Yang Gao Road,
Shanghai 200127, China

电话: (86) 21-6061 1799
传真: (86) 21-6876 1115
Tel: (86) 21-6061 1799
Fax: (86) 21-6876 1115

Declaration

Dear TUV (Rheinland),

We, Jinko Solar Co.,Ltd (Jinko Solar), herewith declare that:

As listed below, the same encapsulation with different thicknesses has the same lamination parameters.

Manufacturer	Type	Thickness
Changzhou Betterial Film Technologies Co., Ltd.	B601HP	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75mm/0.80mm
	B602MP	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75/0.80mm

Manufacturer	Type	Thickness
Changzhou Betterial Film Technologies Co., Ltd.	B601HP	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75mm/0.80mm
	B601W	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75/0.80mm

Manufacturer	Type	Thickness
SHANGHAI TIANYANG HOT MELT ADHESIVES CO., LTD.	JCC-105P-T	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75mm/0.80mm
	JCC-105P	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75/0.80mm

Manufacturer	Type	Thickness
SHANGHAI TIANYANG HOT MELT ADHESIVES CO., LTD.	JCC-105P-T	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75mm/0.80mm
	JCC-105W	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75/0.80mm

Manufacturer	Type	Thickness
Jiangsu Lushan New Materials Co.ltd	EV1050G2	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75mm/0.80mm
	EV1050G5	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75/0.80mm

Manufacturer	Type	Thickness
Zhejiang Sinopont Technology Co., Ltd.	EVA9110T	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75mm/0.80mm
	7100	0.40mm/0.45mm/0.50mm/0.55mm/0.60mm/0.65mm/0.70mm/0.75/0.80mm

Kind regards,



ANLAGE zum Prüfbericht-Nr.: 50173415 056
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ADDITIONAL DOCUMENTATION



晶科能源
www.jinkosolar.com

中国上海浦东新区杨高南路
428号2号楼16层
200127

16F, Building No. 2,
428# South Yang Gao Road,
Shanghai 200127, China

电话: (86) 21-6061 1799
传真: (86) 21-6876 1115

Tel: (86) 21-6061 1799
Fax: (86) 21-6876 1115

Declaration

Dear TUV (Rheinland),

We, Jinko Solar Co.,Ltd (Jinko Solar), herewith declare that:
As listed below, the same encapsulation with different thicknesses has the same lamination parameters.

Manufacturer	Type	Thickness
Cybrid Technologies Inc.	T11	0.40/0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm
	W11	0.40/0.45/0.50/0.55/0.60/0.65/0.70/0.75/0.80mm

Kind regards,



ANLAGE zum Prüfbericht-Nr.: 50173415 056
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

Statement

Company Name: JIANGSU MINGHAO NEW MATERIAL SCI-TECH CORPORATION	Company Name: Jinko Solar Co., Ltd.
Company Address: Xin Zhuang Zhen Chang Nan Cun, Changshu City, Jiangsu Province	Company Address: No. 1 Jinko Road, Shangrao Economic Development Zone, 334100, Jiangxi, P.R. China
Contact Person: zhijin.deng	Contact Person: shuai.hong
Title: Business Assistant	Title: Business Assistant
Mobile: 18626132299	Mobile: 13534071001
Email: zhijin.deng@minghaokeji.cn	Email: shuai.hong@jinkosolar.com

We, JIANGSU MINGHAO NEW MATERIAL SCI-TECH CORPORATION. (hereinafter called MINGHAO), hereby declared the following material(s)/component(s) manufactured by PV silicone weatherproof sealant is/are authorized Jinko Solar Co., Ltd. (hereinafter called Jinko) to use under the type/model of Jinko's. Both types / models are under the same quality management system, using the same raw materials and keeping the same process. The uniformity can be well guaranteed.

Type / Model of MINGHAO	Type / Model of Jinko
MH-3668	JKGJ0001
MH-3667	JKGJ1001
Company Name: JIANGSU MINGHAO NEW MATERIAL SCI-TECH CORPORATION (company seal)	Company Name: Jinko Solar Co., Ltd. (company seal)
Signature: 邓志锦	Signature: 洪帅
Date: 12/14/2021	Date: 12/14/2021

ANLAGE zum Prüfbericht-Nr.: 50173415 056
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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

Statement

Company Name: Changzhou Almaden Stock Co., Ltd	Company Name: Jinko Solar Co., Ltd.
Company Address: 639 East Qinglong Road, Tianning District, Changzhou city, Jiangsu Province, China	Company Address: No. 1 Jinko Road, Shangrao Economic Development Zone, 334100, Jiangxi, P.R. China
Contact Person: 张将	Contact Person: 江玉洁
Title: 销售经理	Title: 采购开发
Mobile: 18535568376	Mobile: 18888635242
Email: zhangjiang@czamd.com	Email: yujie.jiang@jinkosolar.com

We, Changzhou Almaden Stock Co., Ltd (hereinafter called Almaden), hereby declared the following material(s)/component(s) manufactured by Almaden) is/are authorized by Jinko Solar Co., Ltd. (hereinafter called Jinko) to use under the type/model of Jinko's. Both types / models are under the same quality management system, using the same raw materials and keeping the same process. The uniformity can be well guaranteed.

Type / Model of Almaden	Type / Model of Jinko
1. Tempered glass with external AR coating , Thickness =2.0/2.5/2.8/3.2/4.0mm	1. Tempered glass with external AR coating , Thickness =2.0/2.5/2.8/3.2/4.0mm
2. Tempered glass with internal ceramic gridding layer Thickness =2.0/2.5mm	2. Tempered glass with internal ceramic gridding layer Thickness =2.0/2.5mm
3. Tempered glass Thickness =2.0/2.5mm	3. Tempered glass Thickness =2.0/2.5mm

Company Name: Changzhou Almaden Stock Co., Ltd (company seal)	Company Name: Jinko Solar Co., Ltd. (company seal)
Signature:	Signature:
Date:	Date: 04/08/2021



ANLAGE zum Prüfbericht-Nr.: 50173415 056
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FOTO-DOKUMENTATION
 PHOTO DOCUMENTATION

Appendix F: Photos

Module type: JKM550M-72HL4-V (Median power) (BOM1)

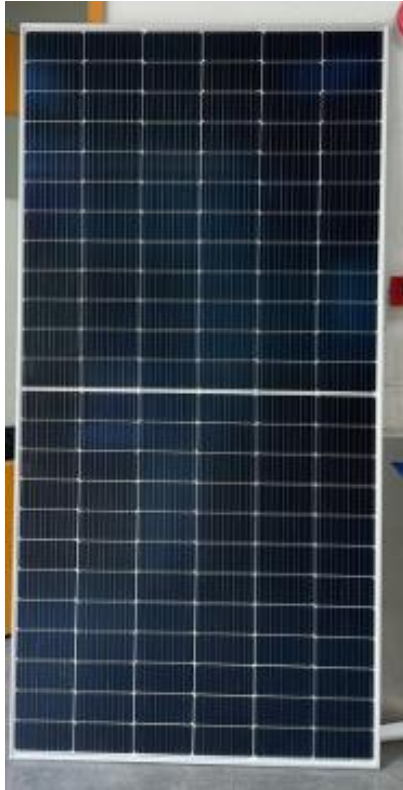


Fig. 1: front view of test sample

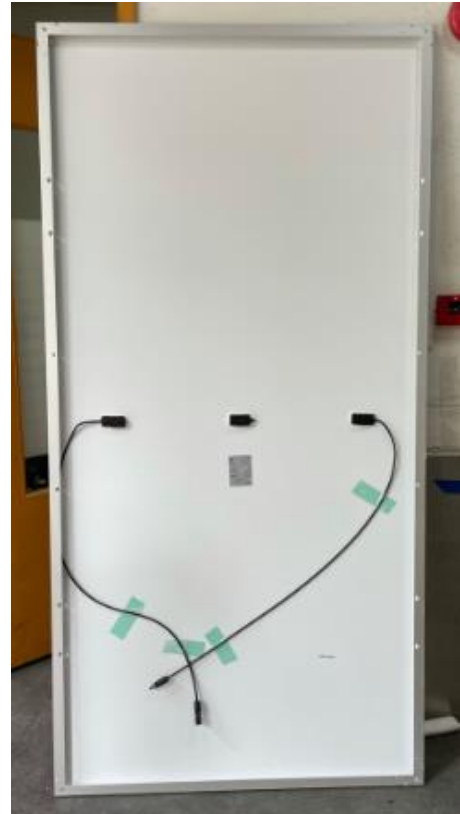


Fig. 2: rear view of test sample

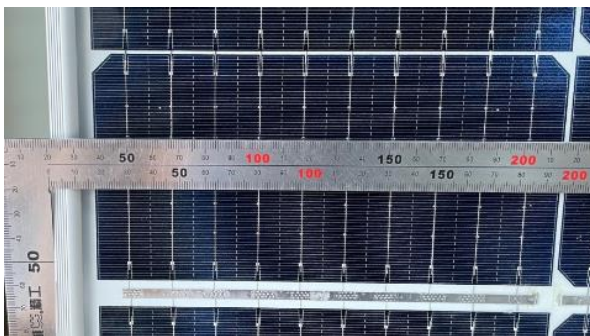







Fig. 3: detail view of solar cell



Jinko Solar Co., Ltd.
 NO.1 Jinko Road Shangrao Economic Development Zone
 Jiangxi Province 334100 China
 www.jinkosolar.com

PHOTOVOLTAIC MODULE
 Made in China

Solar Module Type : JKM550M-72HL4-V		 REC 6716 REC 6716 Applied Protection Certificate www.rec.com 01 51000000
Maximum Power (Pmax)	550W	
Power measurement tolerance	±3%	
Maximum Power Voltage(Vmp)	40.90V	
Maximum Power Current(Imp)	13.45A	
Open Circuit Voltage(Voc)	49.62V ±3%	
Short Circuit Current(Isc)	14.03A ±4%	
Maximum System Voltage	1500VDC	
Maximum Series Fuse Rating	25A	
Operating Temperature	-40°C ~ +85°C	
Protection Class	II	
Fire Class	C	
Weight	** *(kg)	
Dimension	2274×1134×35(mm)	
STC: 1000W/m ² , AM1.5, 25°C		

 **WARNING**

ONLY qualified personnel should install or perform maintenance work on these modules
BE AWARE of dangerous high DC voltage when connecting modules
DO NOT damage or scratch the rear surface of the module
 The modules meet the 2016 version of the standards






Fig. 4: detail view of type label

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FOTO-DOKUMENTATION
PHOTO DOCUMENTATION



Fig. 5: detail view of closed junction box



Fig. 6: detail view of connector



Fig. 7: detail view of cable



Fig. 8: detail view of equipotential bonding hole and symbol



Fig. 9: detail view of frame corner



Fig. 10: detail view of serial number label

FOTO-DOKUMENTATION
PHOTO DOCUMENTATION



Fig. 11: view of mechanical load mounting

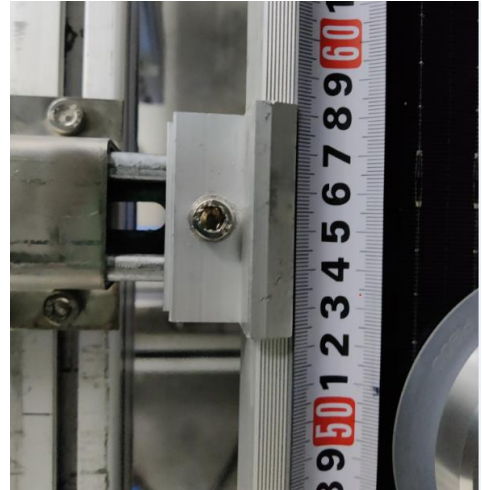


Fig. 12: view of mechanical load mounting

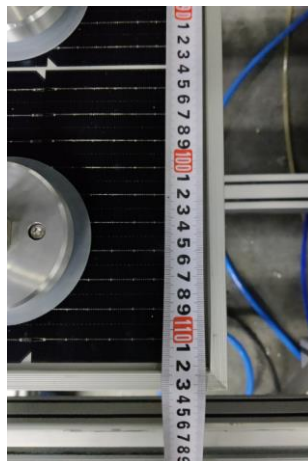


Fig. 13: detail view of mounting method



Fig. 14: view of mechanical load mounting

ANLAGE zum Prüfbericht-Nr.: 50173415 056
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FOTO-DOKUMENTATION
 PHOTO DOCUMENTATION

Module type: JKM570M-7RL4-V (Median power) (BOM1)



Fig. 15: front view of test sample



Fig. 16: rear view of test sample

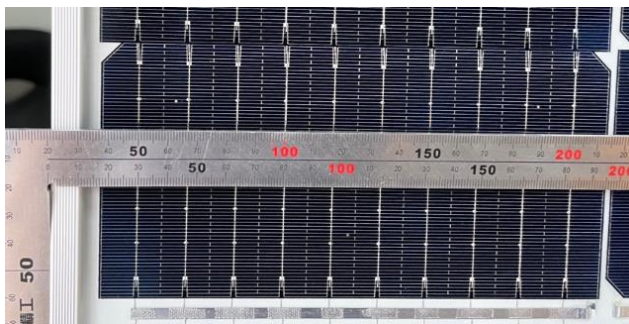



Fig. 17: detail view of solar cell




Jinko Solar
 Building Your Trust in Solar


Jinko Solar Co., Ltd.
 NO.1 Jinko Road Shangrao Economic Development Zone
 Jiangxi Province 334100 China
 www.jinkosolar.com

PHOTOVOLTAIC MODULE
 Made in China


Solar Module Type : JKM570M-7RL4-V	
Maximum Power (Pmax)	570W
Power measurement tolerance	±3%
Maximum Power Voltage(Vmp)	44.25V
Maximum Power Current(Imp)	12.87A
Open Circuit Voltage(Voc)	53.74V±3%
Short Circuit Current(Isc)	13.52A±4%
Maximum System Voltage	1500VDC
Maximum Series Fuse Rating	25A
Operating Temperature	-40°C~+85°C
Protection Class	II
Fire Class	C
Weight	** (kg)
Dimension	2411×1134×35(mm)
STC: 1000W/m ² AM1.5, 25°C	



ISO 9001
 ISO 14001
 ISO 45001
 TÜVRheinland
 INSTITUT FÜR
 ZERTIFIZIERUNG



PV CYCLE



CE

WARNING

ONLY qualified personnel should install or perform maintenance work on these modules
BE AWARE of dangerous high DC voltage when connecting modules
DO NOT damage or scratch the rear surface of the module
 The modules meet the 2016 version of the standards






Fig. 18: detail view of type label

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Fig. 19: detail view of closed junction box



Fig. 20: detail view of connector



Fig. 21: detail view of cable



Fig. 22: detail view of equipotential bonding hole and symbol



Fig. 23: detail view of frame corner

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Module type: JKM550M-72HL4-V (Median power) (BOM2)



Fig. 24 front view of test sample

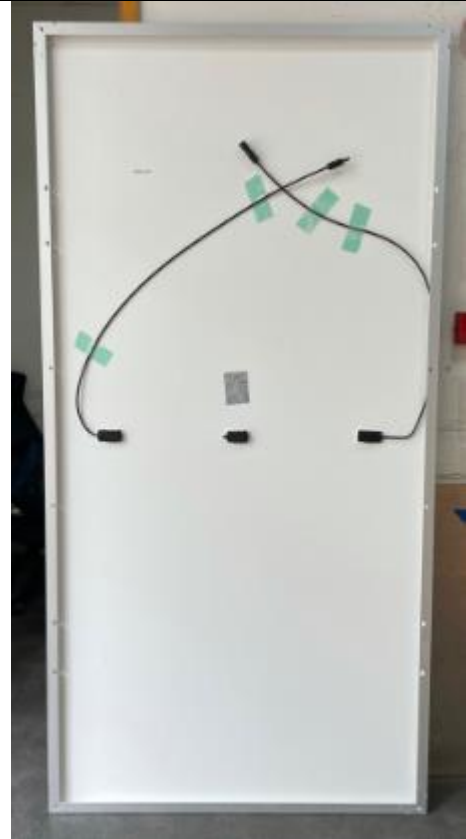







Fig. 25: rear view of test sample



Fig. 26: detail view of solar cell

 Jinko Solar Co., Ltd. NO.1 Jinko Road Shangrao Economic Development Zone Jiangxi Province 334309 China www.jinkosolar.com	
PHOTOVOLTAIC MODULE Made in China	
Solar Module Type : JKM550M-72HL4-V	
Maximum Power (Pmax)	550W
Power measurement tolerance	±3%
Maximum Power Voltage(Vmp)	40.90V
Maximum Power Current(Imp)	13.45A
Open Circuit Voltage(Voc)	49.62V±3%
Short Circuit Current(Isc)	14.03A±4%
Maximum System Voltage	1500VDC
Maximum Series Fuse Rating	25A
Operating Temperature	-40°C ~ +85°C
Protection Class	II
Fire Class	C
Weight	***(kg)
Dimension	2274×1134×35(mm)
STC: 1000W/m ² AM1.5, 25°C	

 TÜV Rheinland www.tuv.com DE 44398 DE 44378 DE 44379 DE 44380 DE 44381 DE 44382 DE 44383 DE 44384 DE 44385 DE 44386 DE 44387 DE 44388 DE 44389 DE 44390 DE 44391 DE 44392 DE 44393 DE 44394 DE 44395 DE 44396 DE 44397 DE 44398 DE 44399	 PV CYCLE www.pv-cycle.com
 CE	

WARNING
 ONLY qualified personnel should install or perform maintenance work on these modules
BE AWARE of dangerous high DC voltage when connecting modules
DO NOT damage or scratch the rear surface of the module
 The modules meet the 2016 version of the standards

Fig. 27: detail view of type label

FOTO-DOKUMENTATION
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Fig. 28: detail view of closed junction box



Fig. 29: detail view of connector



Fig. 30: detail view of cable



Fig. 31: detail view of equipotential bonding hole and symbol



Fig. 32: detail view of frame corner



Fig. 33: detail view of serial number label

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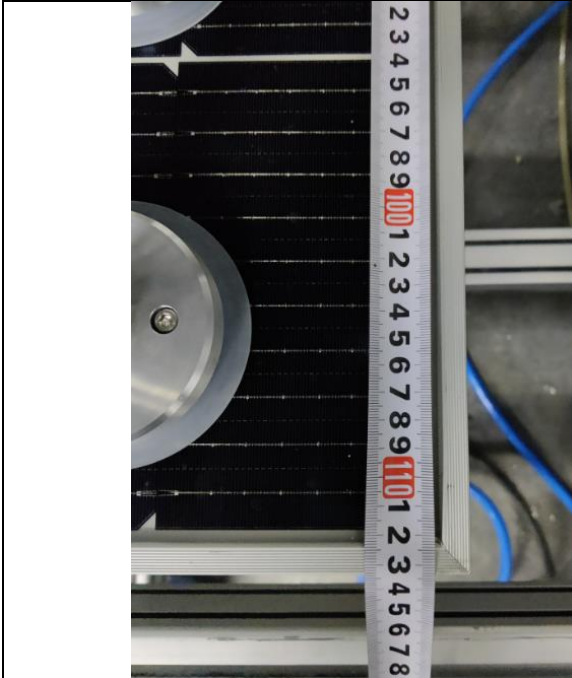


Fig. 34: view of mechanical load mounting



Fig. 35: detail view of mounting method



Fig. 36: detail view of mounting method

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Module type: JKM570M-7RL4-V (Median power) (BOM2)



Fig. 37: front view of test sample



Fig. 38: rear view of test sample

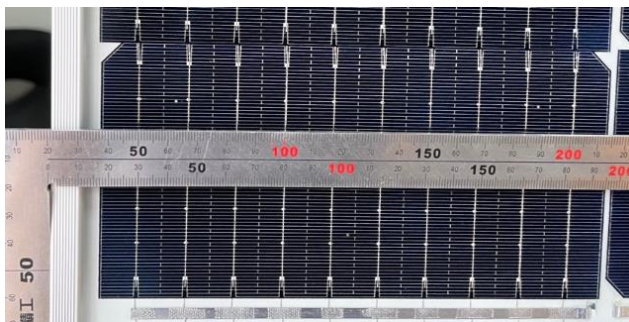


Fig.39: detail view of solar cell

Jinko Solar
 Jinko Solar Co., Ltd.
 NO.1 Jinko Road Shanghai Economic Development Zone
 Jiangsu Province 334100 China
 www.jinkosolar.com

PHOTOVOLTAIC MODULE
 Made in China

Solar Module Type : JKM570M-7RL4-V	
Maximum Power (Pmax)	570W
Power measurement tolerance	±3%
Maximum Power Voltage(Vmp)	44.29V
Maximum Power Current(Imp)	12.87A
Open Circuit Voltage(Voc)	53.74V±3%
Short Circuit Current(Isc)	13.52A±4%
Maximum System Voltage	1500VDC
Maximum Series Fuse Rating	25A
Operating Temperature	-40°C ~ +85°C
Protection Class	II
Fire Class	C
Weight	** (kg)
Dimension	2411×1134×35(mm)
STC: 1000W/m ² , AM1.5, 25°C	

WARNING

ONLY qualified personnel should install or perform maintenance work on these modules

BE AWARE of dangerous high DC voltage when connecting modules

DO NOT damage or scratch the rear surface of the module

The modules meet the 2016 version of the standards












Fig. 40: detail view of type label

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Fig. 41: detail view of closed junction box



Fig. 42: detail view of connector



Fig. 43: detail view of cable



Fig. 44: detail view of equipotential bonding hole and symbol



Fig. 45: detail view of frame corner

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Module type: JKM550M-72HL4-V (Median power) (BOM3)



Fig. 46: front view of test sample

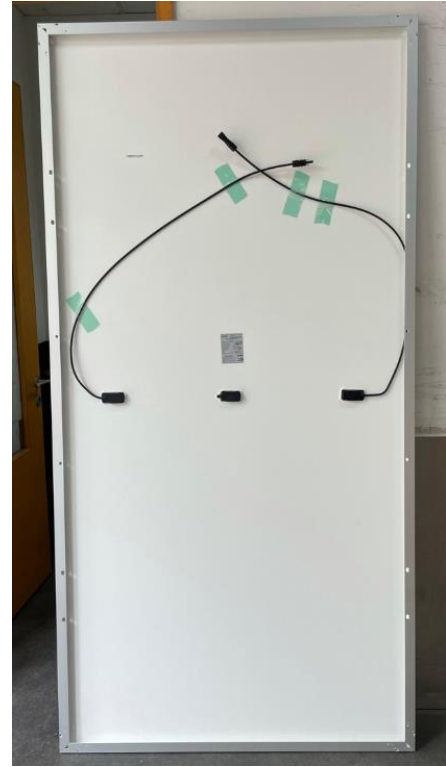


Fig. 47: rear view of test sample

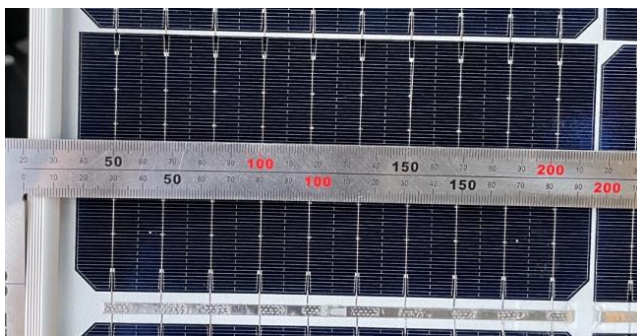






Fig. 48: detail view of solar cell



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Jinko Solar Co., Ltd.
 NO.1 Jinko Road Shangrao Economic Development Zone
 Jiangxi Province 334100 China
 www.jinkosolar.com

PHOTOVOLTAIC MODULE
 Made in China

Solar Module Type : JKM550M-72HL4-V		 IEC 61215 IEC 61730 Power Protection SunSafe www.tuv.com 01 89282442
Maximum Power (Pmax)	550W	
Power measurement tolerance	±3%	
Maximum Power Voltage(Vmp)	40.90V	
Maximum Power Current(Imp)	13.45A	
Open Circuit Voltage(Voc)	49.62V±3%	
Short Circuit Current(Isc)	14.03A±4%	
Maximum System Voltage	1500VDC	
Maximum Series Fuse Rating	25A	
Operating Temperature	-40°C ~ +85°C	
Protection Class	II	
Fire Class	C	
Weight	***(kg)	
Dimension	2274×1134×35(mm)	
STC: 1000W/m ² AM1.5, 25°C		

⚠ WARNING

ONLY qualified personnel should install or perform maintenance work on these modules
BE AWARE of dangerous high DC voltage when connecting modules
DO NOT damage or scratch the rear surface of the module
 The modules meet the 2016 version of the standards






Fig. 49: detail view of type label

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Fig. 50: detail view of closed junction box



Fig. 51: detail view of connector



Fig. 52: detail view of cable



Fig. 53: detail view of equipotential bonding hole and symbol



Fig. 54: detail view of frame corner



Fig. 55: detail view of serial number label

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Module type: JKM570M-7RL4-V (Median power) (BOM3)



Fig. 56: front view of test sample



Fig. 57: rear view of test sample

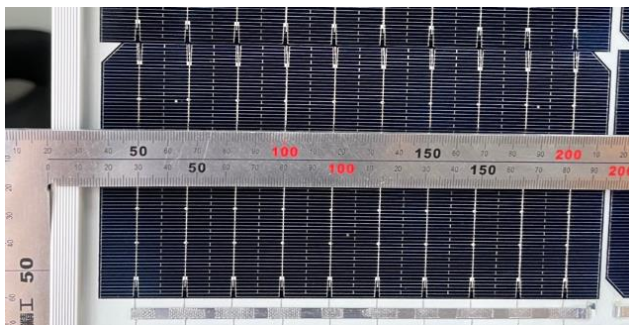




Fig. 58: detail view of solar cell


Jinko Solar Jinko Solar Co., Ltd.
 NO.1 Jinko Road Shanghai Economic Development Zone
 Jiangsu Province 334100 China
 www.jinkosolar.com

PHOTOVOLTAIC MODULE
 Made in China

Solar Module Type : JKM570M-7RL4-V	
Maximum Power (Pmax)	570W
Power measurement tolerance	±3%
Maximum Power Voltage(Vmp)	44.25V
Maximum Power Current(Imp)	12.87A
Open Circuit Voltage(Voc)	53.74V±3%
Short Circuit Current(Isc)	13.52A±4%
Maximum System Voltage	1500VDC
Maximum Series Fuse Rating	25A
Operating Temperature	-40°C ~ +85°C
Protection Class	II
Fire Class	C
Weight	** (kg)
Dimension	2411×1134×35(mm)
STC:	1000W/m ² , AM1.5, 25°C


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 VON ZERTIFIKATEN


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WARNING
 ONLY qualified personnel should install or perform maintenance work on these modules
BE AWARE of dangerous high DC voltage when connecting modules
DO NOT damage or scratch the rear surface of the module
 The modules meet the 2016 version of the standards






Fig. 59: detail view of type label

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Fig. 60: detail view of closed junction box



Fig. 61: detail view of connector



Fig. 62: detail view of cable



Fig. 63: detail view of equipotential bonding hole and symbol



Fig. 64: detail view of frame corner

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Module type: JKM550M-72HL4-V (Median power) (BOM4)




Fig. 65: front view of test sample



Fig. 66: rear view of test sample



Fig. 67: detail view of solar cell




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 NO.1 Jinko Road Shangrao Economic Development Zone
 Jiangxi Province 334100 China
 www.jinkosolar.com


PHOTOVOLTAIC MODULE
 Made in China

Solar Module Type : JKM550M-72HL4-V	
Maximum Power (Pmax)	550W
Power measurement tolerance	±3%
Maximum Power Voltage(Vmp)	40.90V
Maximum Power Current(Imp)	13.45A
Open Circuit Voltage(Voc)	49.62V±3%
Short Circuit Current(Isc)	14.03A±4%
Maximum System Voltage	1500VDC
Maximum Series Fuse Rating	25A
Operating Temperature	-40°C ~ +85°C
Protection Class	II
Fire Class	C
Weight	** *(kg)
Dimension	2274×1134×35(mm)
STC: 1000W/m ² AM1.5, 25°C	



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⚠ WARNING

ONLY qualified personnel should install or perform maintenance work on these modules

BE AWARE of dangerous high DC voltage when connecting modules

DO NOT damage or scratch the rear surface of the module

The modules meet the 2016 version of the standards






Fig. 68: detail view of type label

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Fig. 69: detail view of closed junction box



Fig. 70: detail view of connector



Fig. 71: detail view of cable



Fig. 72: detail view of equipotential bonding hole and symbol

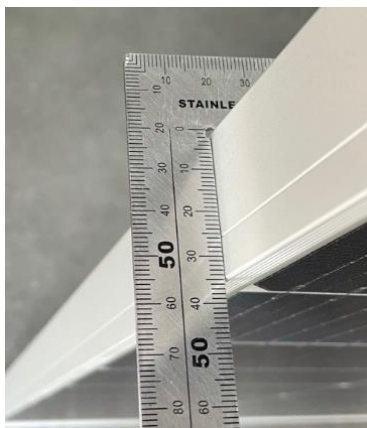


Fig. 73 detail view of frame corner

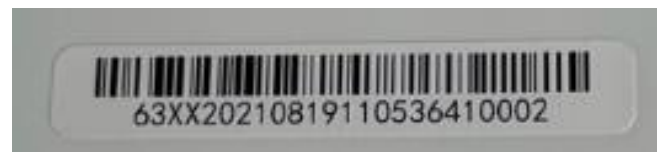


Fig. 74: detail view of serial number label

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Module type: JKM570M-7RL4-V (Median power) (BOM4)



Fig. 75: front view of test sample



Fig. 76: rear view of test sample

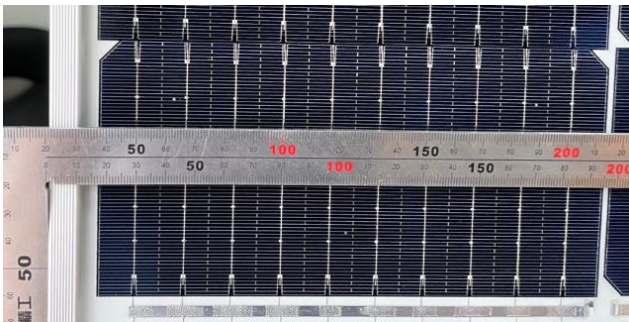



Fig. 77: detail view of solar cell


Jinko Solar Jinko Solar Co., Ltd.
 NO.1 Jinko Road Shangrao Economic Development Zone
 Jiangxi Province 334100 China
 www.jinkosolar.com


PHOTOVOLTAIC MODULE
 Made in China

Solar Module Type : JKM570M-7RL4-V	
Maximum Power (Pmax)	570W
Power measurement tolerance	±3%
Maximum Power Voltage(Vmp)	44.29V
Maximum Power Current(Imp)	12.87A
Open Circuit Voltage(Voc)	53.74V±3%
Short Circuit Current(Isc)	13.52A±4%
Maximum System Voltage	1500VDC
Maximum Series Fuse Rating	25A
Operating Temperature	-40°C~+85°C
Protection Class	II
Fire Class	C
Weight	** (kg)
Dimension	2411×1134×35(mm)
STC: 1000W/m ² , AM1.5, 25°C	



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WARNING

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BE AWARE of dangerous high DC voltage when connecting modules
DO NOT damage or scratch the rear surface of the module
 The modules meet the 2016 version of the standards






Fig. 78: detail view of type label

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Fig. 79: detail view of closed junction box



Fig. 80: detail view of connector



Fig. 81: detail view of cable



Fig. 82: detail view of equipotential bonding hole and symbol



Fig. 83: detail view of frame corner

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Fig. 79: detail view of closed junction box



Fig. 80: detail view of connector



Fig. 81: detail view of cable



Fig. 82: detail view of equipotential bonding hole and symbol

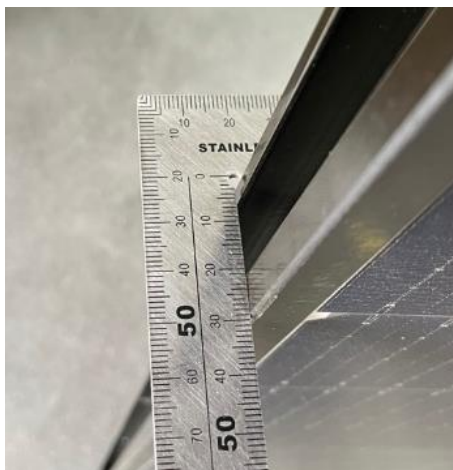


Fig. 83: detail view of frame corner



Fig. 84: detail view of serial number

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Fig. 85: detail view of mechanical load mounting



Fig. 86: detail view of mechanical load mounting