Test Report issued under the responsibility of:

VDE

TEST REPORT
IEC 61701:2011
Salt Mist Corrosion Testing of Photovoltaic (PV) Modules

Test Report Reference No. .....:	TRPVM-2021-40733-1
Date of issue (YYYY-MM-DD) .....:	2021-10-25
Total number of pages .....:	21
Name of Testing Laboratory preparing the Report.....:	TAIER LABS (JIAXING) CO., LTD.
Applicant's name .....:	Zhejiang Beyondsun Green Energy Technology Co., Ltd.
Address.....:	No.888, Zhili Section of G318 Zhili Town, Huzhou City, Zhejiang province, China.
Test specification.....:	
Standard.....:	IEC 61701:2011
Test procedure .....:	VDE-scheme ☒
Non-standard test method .....:	N/A
Test Report Form No. .....:	IEC61701_B
Test Report Form Originator.....:	**VDE** Testing and Certification Institute
Master TRF.....:	Dated 2019-10

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description .....:	Photovoltaic (PV) Module(s)
Trade Mark.....:	Beyondsun
Manufacturer.....:	TSHM450-144HW
Model/Type reference.....:	Zhejiang Beyondsun Green Energy Technology Co., Ltd.
Ratings.....:	See page 6

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	CB Laboratory:	TAIER LABS (JIAXING) CO., LTD	
Testing location/ address..... :		Building 7, 3556 Linggongtang Road, Nanhu, District, Jiaxing, Zhejiang	
Tested by (name, function, signature) ..... :		Guangyuan Chen Testing Engineer (Authorization of test report)	
Approved by (name, function, signature) ..... :		Chengying Shi Technical certification officer	
☐	Testing procedure: CTF Stage 1:		
Testing location/ address..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) ..... :			
☐	Testing procedure: CTF Stage 2:		
Testing location/ address..... :			
Tested by (name + signature) ..... :			
Witnessed by (name, function, signature) ..... :			
Approved by (name, function, signature) ..... :			
☐	Testing procedure: CTF Stage 3:		
☐	Testing procedure: CTF Stage 4:		
Testing location/ address..... :			
Tested by (name, function, signature) ..... :			
Witnessed by (name, function, signature) ..... :			
Approved by (name, function, signature) ..... :			
Supervised by (name, function, signature) ..... :			

List of Attachments (including a total number of pages in each attachment):	
	attachment number / number of pages
Installation manual	N/A
Drawings mechanical	N/A
Circuit diagram	N/A
Photographs	N/A
Component datasheets / certificates	N/A
Others:	
Product Description Sheet (Manufacturers and type references)	N/A
List of test equipment used	N/A
Test table for verifying other stabilization procedure	N/A

Summary of testing:

Tests performed (name of test and test clause):

IEC 61707:2011, Salt mist corrosion test on:

☒ Crystalline silicon PV module

☒ Full-sized module for testing

☐ Smaller representative sample module for testing

☐ Thin-film PV module

☐ Full-sized module for testing

☐Smaller representative sample module for testing

For severity: 1 ☐, 3 ☐, 4 ☐, 5 ☐, 6 ☒

The modules have been tested as representative for all modules listed in VDE license 40050436, using the same BOM. All tests have been performed by TÜV Rheinland in report number 60442240 001 which has been issued on 2021-05-28. See attachment 1 for details.

Testing location:

See page 2.

Summary of compliance with National Differences (List of countries addressed):

N/A

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

(Note: The marking plate represents all models covered by this report except for difference in electrical ratings and model designation. See “General product information” for electrical ratings for all models. As there will be other lower wattages to be covered under same report which follows same back label format.)

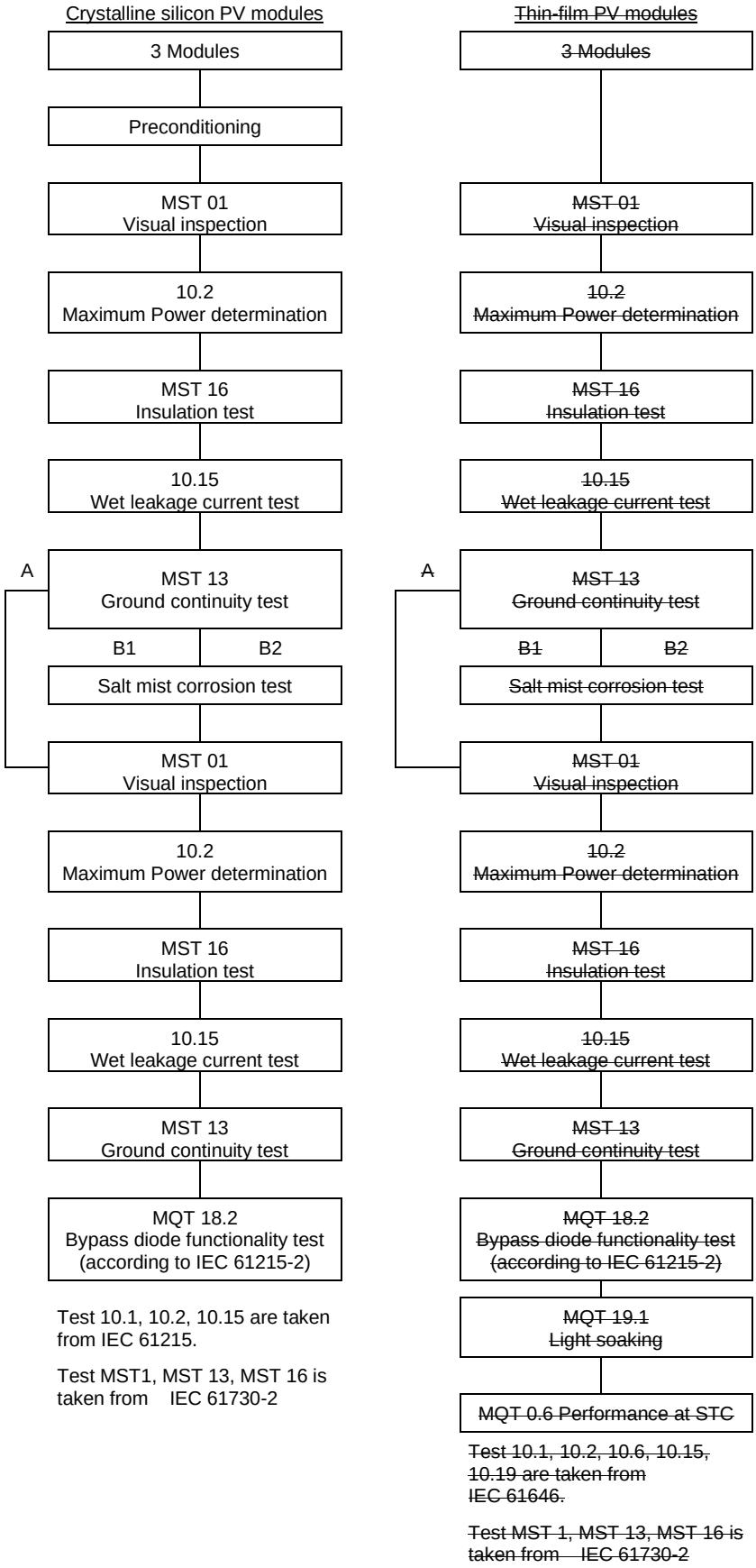
Test item particulars .....:	
Accessories and detachable parts included in the evaluation.....:	
Mounting system used .....:	Schletter
Other options included .....:	N/A
Possible test case verdicts:	
- test case does not apply to the test object ..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
Abbreviations which may be used in the report:	
Pmax – Maximum power	HF – Humidity Freeze
Vmp – Maximum power voltage	DH – Damp Heat
Imp – Maximum power current	TC – Thermal Cycling
Isc – Short circuit current	α – Current temperature coefficient
Voc – Open circuit voltage	β – Voltage temperature coefficient
FF – Fill factor	δ – power temperature coefficient
STC – Standard Test Conditions (25°C, 1 000 W/m²)	NMOT – Nominal Module Operating Temperature (20°C, 800 W/m²)
MQT – Module Quality Tests	$V_{FMrated}$ – Rated diode(s) forward voltage
VFM – Measured diode(s) forward voltage	NP – Nameplate
m_1 – the measurement uncertainty in % of laboratory for Pmax	m_2 – the measurement uncertainty in % of laboratory for Voc
m_3 – the measurement uncertainty in % of laboratory for Isc	t_1 – the manufacturer's rated lower production tolerance in % for Pmax
t_2 – the manufacturer's rated upper production tolerance in % for Voc	t_3– the manufacturer's rated upper production tolerance in % for Isc
r – Pmax measurement reproducibility	
Testing Dates (YYYY-MM-DD)	
Date of first test item received..... :	2020/12/30
Dates of tests (beginning/end) ..... :	2021/01/04 – 2021/04/01

GENERAL REMARKS:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a ☐ comma / ☒ point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (factories) ..... :	Al listed in VDE license 40050436.

PRODUCT ELECTRICAL RATINGS:				
Module type	TSHM450-144HW			
Voc [V]	50.43+/-4%			
Vmp [V]	42.06			
Imax [Adc]	10.70			
Isc [Adc]	11.43+/-4%			
Pmp [W]	450+/-3%			
Maximum system voltage [V]	1500			
Maximum Over-Current Protection Rating [A]	25			
Note:				

MODULE GROUP ASSIGNMENT:				
Sample #	Sample Group ID	Type/model	Sample S/N	Remark
M1	A	TSHM450-144HW	820617181200062	
M2	B1	TSHM450-144HW	820617181200066	
M3	B2	TSHM450-144HW	820617181200067	
Supplementary information				

10	**TEST PROCEDURES** Note: Deviations from test sequence are possible but must be documented.



IEC 62716:2013			
Clause	Requirement + Test	Result - Remark	Verdict
4	**MARKING**		P
	Name, monogram or symbol of manufacturer :	Beyondsun	P
	Type or model number..... :	TSHM450-144HW	P
	Serial number..... :	See page 6	P
	Polarity of terminals or leads ..... :	+/- sign on connector	P
	Maximum system voltage ..... :	1500V	P
	The date and place of manufacture..... :	Traceable by serial number	P
	Initial examination	All modules	P
10	Preconditioning .....:	5 Wh/m^2	P
10.1	Visual inspection .....:	See attached TÜV Reports	P
10.2	Maximum power determination	See attached TÜV Reports	P
10.3	Insulation test.....:	See attached TÜV Reports	P
10.15	Wet leakage current test / Wet insulation test .:	See attached TÜV Reports	P
MST13	Ground continuity test.....:	See attached TÜV Reports	P
Group A	Control Module	Sample Group ID A	P
Group B	2 Modules	Sample Group ID B	P
	Salt mist corrosion test.....:	See attached TÜV Reports	P
	Final measurement	All modules	P
10.1	Visual inspection .....:	See attached TÜV Reports	P
10.2	Maximum power determination / Electrical performance measurement .....:	See attached TÜV Reports	P
10.3	Insulation test.....:	See attached TÜV Reports	P
10.15	Wet leakage current test.....:	See attached TÜV Reports	P
MST13	Ground continuity test.....:	See attached TÜV Reports	P
Diode	Bypass diode functionality test .....:	See attached TÜV Reports	P
10.19	Light soaking.....:		N/A
10.6	Performance at STC .....:		N/A

ATTACHMENT 1:

Produkte
Products

TÜVRheinland®

Prüfbericht-Nr.: *Test Report No.:*	**60442240 001**	**Auftrags-Nr.:** *Order No.:*	244244351	Seite 1 von 13 *Page 1 of 13*
Kunden-Referenz-Nr.: *Client Reference No.:*	2254907	**Auftragsdatum:** *Order date:*	30/05/2019	
Auftraggeber: *Client:*	**Zhejiang Beyondsun Green Energy Technology Co., Ltd.** No.888 Zhili Section of G318 Zhili Town,Huzhou City,Zhejiang Province,China			
Prüfgegenstand: *Test item:*	Photovoltaic (PV) Module(s)			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	See module type designation list on page 3			
Auftrags-Inhalt: *Order content:*	Salt mist corrosion testing of photovoltaic (PV) modules			
Prüfgrundlage: *Test specification:*	IEC 61701:2011, EN 61701:2012 severity 6 Salt mist corrosion testing of photovoltaic (PV) modules			

Wareneingangsdatum: *Date of receipt:*	30/12/2020
Prüfmuster-Nr.: *Test sample No.:*	See page 9
Prüfzeitraum: *Testing period:*	04/01/2021 – 01/04/2021
Ort der Prüfung: *Place of testing:*	TÜV Rheinland (Shanghai) Co., Ltd.
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shanghai) Co., Ltd.
Prüfergebnis*: *Test result*:*	Pass

Detaillierte Fotodokumentation
siehe Anlage zu diesem Bericht

Detailed photo documentation see appendix to this report

geprüft von / *tested by*:

28/05/2021	Joy Sun / Project Engineer	Joy Sun
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

kontrolliert von / *reviewed by*:

28/05/2021	Lei C. L. Chen / Reviewer	Lei Chen
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other*:

- Basic qualification for page 3 listed module types.
- Valid in conjunction with TÜV Rheinland certificate PV 50481089.
- Valid only for the material combinations as listed in Constructional Data Form (CDF) in appendix of this test report.

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* 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
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*

TÜV Rheinland (Shanghai) Co., Ltd.
TÜV Rheinland Building, No. 177, Lane 777, West Guangzhong Road, Zhabei District, Shanghai 200072, P.R. China

Produkte
Products

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Liste der verwendeten Prüfmittel
List of used test equipment

Prüfmittel *Test equipment*	**Prüfmittel-Nr. / ID-Nr.** *Equipment No. / ID-No.*	**Nächste Kalibrierung** *Next calibration*

All equipment used for tests, including equipment for subsidiary measurements having a significant effect on the accuracy or validity of the result of the test is calibrated before being put into service.
The laboratory has an established programme and procedure for the calibration of its equipment according to EN ISO/IEC 17025 (Reg. no.: D-PL-11097-02-01).

Produktbeschreibung
Product description

1 Produktdetails
Product details

New model types:

Max. System Voltage: up to 1500 VDC (Voc at STC):
With ½ cut mono c-Si cells:
TSHMxxx-144HW (xxx=435-465, in steps of 5, 144 cells)
TSHMxxx-132HW (xxx=400-425, in steps of 5, 132 cells)
TSHMxxx-120HW (xxx=365-385, in steps of 5, 120 cells)
TSHMxxx-108HW (xxx=330-345, in steps of 5, 108 cells)
TSHMxxx-96HW (xxx=290-305, in steps of 5, 96 cells)
TSHMxxx-72HW (xxx=220-230, in steps of 5, 72 cells)

Max. System Voltage: up to 1000 VDC (Voc at STC):
TSHMxxx-144W (xxx=435-465, in steps of 5, 144 cells)
TSHMxxx-132W (xxx=400-425, in steps of 5, 132 cells)
TSHMxxx-120W (xxx=365-385, in steps of 5, 120 cells)
TSHMxxx-108W (xxx=330-345, in steps of 5, 108 cells)
TSHMxxx-96W (xxx=290-305, in steps of 5, 96 cells)
TSHMxxx-72W (xxx=220-230, in steps of 5, 72 cells)

xxx represents output power in Wp

2 Adresse(n) der Fertigungsstätte(n)
Address(es) of the manufacturing site(s)

Name / Description:	Zhejiang Beyondsun Green Energy Technology Co., Ltd.
Street:	No.888 Zhili Section of G318 Zhili Town
Postcode / City, Country:	313008 / Huzhou City,Zhejiang Province,China
Type of production:	c-Si PV-module production
Inspection report No / Inspection date	60414818 001 / 27/08/2020

3 History of certification

N/A

Produktbeschreibung
Product description

4 Zusammenfassung der Prüfergebnisse
Summary of test results

According to the inquiry the resistance to salt mist of photovoltaic (PV) modules should be assessed in accordance with IEC 61701:2011, EN 61701:2012 severity 6.

For the qualification of the modules to this tests initial and final control measurements were performed before and after the salt mist corrosion testing. The measurements included relative power measurements, insulation testing and visual inspection. The maximum permissible power degradation of 5% must not be exceeded. Furthermore the minimum requirements for the insulation test and wet leakage test as defined in IEC 61215:2005 10.3 and 10.15 have to be met. No major visual defects as defined in IEC 61215 shall occur.

The test of the requirements of IEC 61701:2011, EN 61701:2012 were performed on module type CHSM6612P/HV-340 as representative module and the test results are all fulfilled according to its regulations of the pass criteria. The above listed module types have been fully certified according to the IEC 61215-1:2016, IEC 61215-1-1:2016, IEC 61215-2:2016, IEC 61730-1:2016, IEC 61730-2:2016, and EN 61215-1:2016; EN 61215-1-1:2016; EN 61215-2:2017; EN IEC 61730-1:2018; EN IEC 61730-2:2018 standards before salt mist resistance test was applied.

- This is a basic qualification testing according to standard IEC 61701:2011, EN 61701:2012 severity 6. The tests were performed on TSHM450-144HW as representative model. The test results are documented within this test report.

- The materials and modifications in below table have been approved on module with glass-backsheet construction module under 1500V maximum system voltage according to standard IEC 61215-2:2016 and IEC 61730-2:2016. Following materials are not the critical materials for salt mist corrosion testing. No additional testing is considered necessary for the following modifications.

Object	Manufacturer / trademark	Type / model	Technical data / ratings	Previous approved test report No.
Cell connectors	Jiangyin ESUN new materials technology Co., Ltd.	Sn60Pb40	L(mm)xT(mm) 1.0x0.23/0.25/0.27	60410450 001
Cell connectors	Changzhou Greateen New Energy Technology Co., Ltd	Sn60Pb40	L(mm)xT(mm) 1.0x0.23/0.25/0.27	60410450 001
		Sn60Pb40	Φ=0.32mm	60410450 002
Cell connectors	Changzhou Benjamin photovoltaic New material Technology Co Ltd.	Sn60Pb40	Φ=0.35mm/0.32mm	60410450 003
String connectors	Jiangyin ESUN new materials technology Co., Ltd.	Sn60Pb40	L(mm)xT(mm) 5.0x0.35 6.0x0.35	60410450 001
String connectors	Changzhou Greateen New Energy Technology Co., Ltd	Sn60Pb40	L(mm)xT(mm) 6.0x0.35	60410450 001

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Produktbeschreibung
Product description

String connectors	Changzhou Benjamin photovoltaic New material Technology Co Ltd.	Sn60Pb40	L(mm)xT(mm) 5.0x0.35	60410450 003
Bypass diode	ChangZhou Star Sea Electronics Co.,Ltd.	FMK4525A for FT50xy(x=1)	Tj max =200°C	60410450 001

The appendix of this test report includes the following annexes (12 Pages):
Annex 1: Constructional Data Form (CDF)
Annex 2: Photos of module
Annex 3: Measurement reports

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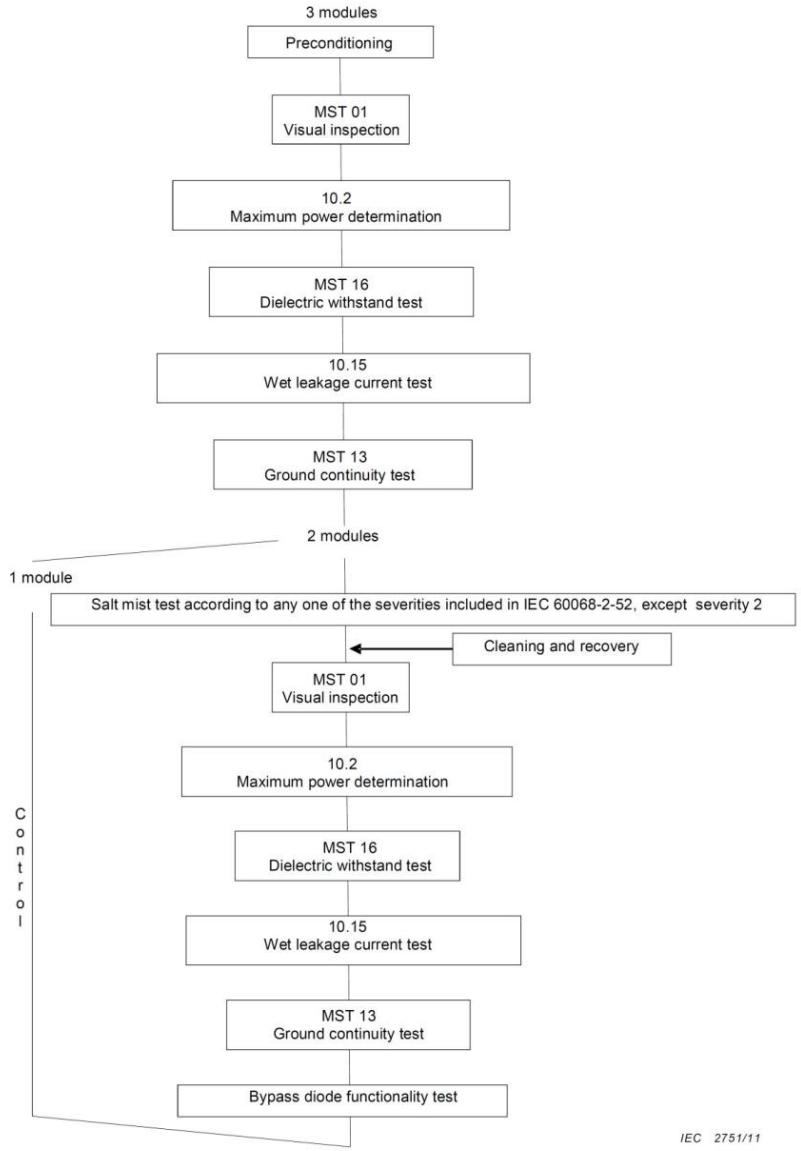
Absatz	**IEC 61701:2011, EN 61701:2012 severity 6**	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

Test Procedures:



NOTE 1 Preconditioning and tests 10.2 and 10.15 are taken from IEC 61215. Tests MST 01, MST 13 and MST 16 are taken from IEC 61730-2.

NOTE 2 The control module should be used as a check every time the test modules are measured to evaluate the effect of the salt mist test.

Absatz	**IEC 61701:2011, EN 61701:2012 severity 6**	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

-	**List of test samples**		
Module type: TSHM450-144HW			—
Sample No.	Sample S/N	Remarks / constructional characteristics	
1	820617181200062	Front cover: 3.2 mm Tempered Low Iron Pattern Glass with AR from Flat Glass Group Co., Ltd. Rear cover: Cynagard205A(R) from Cybrid tecnologies Inc. Solar cell: 166S-9BB (mono c-Si with 9 dotted busbars) from Zhejiang Beyondsun PV Co., Ltd Encapsulation material: F406P and TF8 from Hangzhou First PV Material Co., Ltd. Frame: Anodized Aluminium Alloy 6005-T5 from Huzhou Bei Sheng aluminum technology Co.,LTD, thickness=35mm Frame and junction box adhesive: HT906Z, Color: White from Shanghai Huitian New Chemical Material Co., Ltd. String connector: Sn60Pb40 from Changzhou Greateen New Energy Technology Co.,Ltd. L(mm)xT(mm)=5.0x0.35 Cell connector: Sn60Pb40 from Changzhou Greateen New Energy Technology Co.,Ltd. Φ=0.35mm Junction box: FT50xy from Zhejiang Renhe Photovoltaic Technology Co., Ltd. Cable: H1Z2Z2-K 1X1,5...35mm² from Zhejiang Renhe Photovoltaic Technology Co., Ltd. Connectors: 05-8 from Zhejiang Renhe Photovoltaic Technology Co., Ltd. Bypass diode: FMK4530T from Zhejiang Renhe Photovoltaic Technology Co., Ltd. Potting material: 5299W-S from Shanghai Huitan New Material Co., Ltd. Fixing tape: UV-1 from 3M. Fluxing agent: SF56 from Singapore Asahi Chemical & Solder Industries Pte Ltd Insulation tape: BEC-201 from SuZhou First PV Material Co., Ltd.	
2	820617181200066		
3	820617181200067		
Supplementary information : N/A			

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Absatz *Clause*	**IEC 61701:2011, EN 61701:2012 severity 6** Anforderungen - Prüfungen / *Requirements - Tests*	Messergebnisse - Bemerkungen *Measuring results - Remarks*	Bewertung *Evaluation*

6.2 c)	**Visual inspection (Initial)**	
Test Date [DD/MM/YYYY]	05/01/2021	—
Sample No.	Nature and position of initial findings	—
1	No visual defects	P
2	No visual defects	P
3	No visual defects	P
Supplementary information: N/A		

6.2 a)	**Maximum power determination (Initial)**						
Test Date [DD/MM/YYYY]			06/01/2021				—
Module temperature [°C]			Corrected to 25				
Irradiance [W/m²]			1000				
Sample No.	P_{max} [W]	V_{mpp} [V]	I_{mpp} [A]	V_{oc} [V]	I_{sc} [A]	FF [%]	
1	452.2	41.63	10.864	49.66	11.347	80.3	—
2	453.4	42.01	10.793	49.73	11.374	80.2	—
3	451.9	41.92	10.779	49.68	11.352	80.1	—
Supplementary information: N/A							

Absatz	**IEC 61701:2011, EN 61701:2012 severity 6**	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

6.2 e) Dielectric withstand test (Initial)

Test Date [DD/MM/YYYY]				08/01/2021		—
Maximum system voltage [V_{DC}]				1500		
High voltage applied [V_{DC}]				8000		
Insulation resistance measured at [V_{DC}]				1500		
Sample No.	Measured	Area	Result*	Dielectric breakdown		
	[GΩ]	[m²]	[GΩ × m²]	Yes (description)	No	
1	57.70	2.17	125.21	-	No	P
2	51.70	2.17	112.19	-	No	P
3	44.10	2.17	95.70	-	No	P
* Minimum requirement acc. to the standard is 0.04 GΩ*m²						
Supplementary information: -						

6.2 b) Wet leakage current test (Initial)

Test Date [DD/MM/YYYY]		08/01/2021		—
Insulation resistance measured at [V_{DC}]		1500		
Solution resistivity [Ω cm]		< 3,500		
Solution temperature [°C]		22 ± 3		
Sample No.	Measured	Area	Result*	
	[MΩ]	[m²]	[MΩ × m²]	
1	27800.0	2.17	60326.0	P
2	3000.0	2.17	6510.0	P
3	28300.0	2.17	61411.0	P
* Minimum requirement acc. to the standard is 40 MΩ × m²				
Supplementary information: -				

Absatz	IEC 61701:2011, EN 61701:2012 severity 6	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

6.2 d) Ground continuity test (Initial)

Test Date [DD/MM/YYYY]		08/01/2021		—
Maximum over-current protection rating [A]		25		
Current applied [A]		62.5		
Location of designated grounding point		At the longer side of frame		
Location of second contacting point		Adjacent side with greatest distance from the grounding point; At the center of another longer side; At the center of another shorter side.		
Sample No.	Position in test sequence	Voltage [mV]	Resistance [mΩ]	
1	Reference sample	66.5 65.8 65.2	1.064 1.053 1.043	P
2	Salt mist corrosion test	65.1 67.4 66.3	1.042 1.078 1.061	P
3	Salt mist corrosion test	64.2 64.9 65.3	1.027 1.038 1.045	P
Supplementary information: N/A				

7 Salt mist corrosion test

Test Date [DD/MM/YYYY] start / end	15/01/2021 – 15/03/2021	—
NaCl - concentration [%]	5	
Course of cycle (7 days)	- Spraying: 2h / 15 - 35°C / reaction of NaCl - Humidity storage: 20-22h / 40°C / RH 93% - After four periods of spraying and humidity storage, one storage period under standard atmosphere: 3 days / 23°C / RH 45%-55%	
Duration	8 cycles = 56 days	
Sample No.	—	—
2	—	—
3	—	—
Supplementary information: N/A		

Absatz	IEC 61701:2011, EN 61701:2012 severity 6	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

9.2 c)	**Visual inspection after salt mist corrosion test**	
Test Date [DD/MM/YYYY]	15/03/2021	
Sample No.	Nature and position of findings	—
2	Nature and position of findings	—
3	Nature and position of findings	—
Supplementary information: N/A		

9.2 a)	**Maximum power determination after salt mist corrosion test**							
Test Date [DD/MM/YYYY]			30/03/2021					—
Module temperature [°C]			Corrected to 25					
Irradiance [W/m²]			1000					
Sample No.	P_{max} [W]	V_{mpp} [V]	I_{mpp} [A]	V_{oc} [V]	I_{sc} [A]	FF [%]	Degradation [%]	
2	447.1	52.68	10.726	49.70	11.192	80.4	-1.39	P
3	445.5	41.59	10.710	49.69	11.144	80.5	-1.42	P
Supplementary information: The maximum allowable Pmax degradation after this test is 5%.								

9.2 e)	**Dielectric withstand test after salt mist corrosion test**					
Test Date [DD/MM/YYYY]				29/03/2021		—
Maximum system voltage [V_{DC}]				1500		
High voltage applied [V_{DC}]				8000		
Insulation resistance measured at [V_{DC}]				1500		
Sample No.	Measured	Area	Result*	Dielectric breakdown		
	[GΩ]	[m²]	[GΩ × m²]	Yes (description)	No	
2	3.76	2.17	8.16	-	No	P
3	5.95	2.17	12.91	-	No	P
* Minimum requirement acc. to the standard is 0.04 GΩ*m²						
Supplementary information: N/A						

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Absatz *Clause*	**IEC 61701:2011, EN 61701:2012 severity 6** Anforderungen - Prüfungen / *Requirements - Tests*	Messergebnisse - Bemerkungen *Measuring results - Remarks*	Bewertung *Evaluation*

9.2 b)	**Wet leakage current test after salt mist corrosion test**			
Test Date [DD/MM/YYYY]		29/03/2021		—
Insulation resistance measured at [V_{DC}]		1500		
Solution resistivity [Ω cm]		< 3,500		P
Solution temperature [°C]		22 ± 3		P
Sample No.	Measured [MΩ]	Area [m²]	Result* [MΩ × m²]	—
2	5470.0	2.17	11869.9	P
3	4870.0	2.17	10567.9	P
* Minimum requirement acc. to the standard is 40 MΩ × m²				
Supplementary information: N/A				

9.2 d)	**Ground continuity test after salt mist corrosion test**			
Test Date [DD/MM/YYYY]		29/03/2021		—
Maximum over-current protection rating [A]		25		
Current applied [A]		62.5		
Location of designated grounding point		At the longer side of frame		
Location of second contacting point		Adjacent side with greatest distance from the grounding point; At the center of another longer side; At the center of another shorter side.		
Sample No.	Position in test sequence	Voltage [mV]	Resistance [mΩ]	
2	Salt mist corrosion test	49.5 51.2 50.3	0.792 0.819 0.805	P
3	Salt mist corrosion test	56.2 60.1 57.8	0.899 0.962 0.925	P
Supplementary information: N/A				

Absatz	**IEC 61701:2011, EN 61701:2012 severity 6**	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

9.2 f)	**Bypass diode functional test after salt mist corrosion test**			
Test Date [DD/MM/YYYY]		01/04/2021		—
Number of diodes in junction box		3		
Diode manufacturer		ZHEJIANG RENHE PHOTOVOLTAIC TECHNOLOGY CO.,LTD.		
Diode type designation		FMK4530T		
Max. permissible junction temperature Tj_{max} [°C] (according to diode datasheet)		200		
Sample No.	Diode 1	Diode 2	Diode 3	
2	Functional	Functional	Functional	P
3	Functional	Functional	Functional	P
Supplementary information: N/A				

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