

Test Report

No. TRPVP12128/23P/01_R1

Commission Testing
according to IEC 61730-2 / EN IEC 61730-2

Applicant: **Solar Fabrik GmbH**
Hermann-Niggemann-Straße 7, D-63846 Laufach, Germany

File No.: PVP12128/23P-01

Designed: by:
(Project Engineer)

Reviewed: by:
(Technical Certifier)

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Applicant..... :	Solar Fabrik GmbH Hermann-Niggemann-Straße 7, D-63846 Laufach, Germany
Manufacturer	Coded by debtor no. 55560544
Order No. :	QT-PVP12128/23P
Date of Application	12/26/2023
Product	Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
Module type(s)..... :	Double Glass PV Modules with Half-cut 182mm TOPcon Monocrystalline Silicon Solar Cells: 156 cells: Mono S4 HC V 615 BF-DG 144 cells: Mono S4 HC V xxx BF-DG (xxx=545-590 in steps of 5) 132 cells: Mono S4 HC V xxx BF-DG (xxx=495-540 in steps of 5) 120 cells: Mono S4 HC V xxx BF-DG (xxx=445-490 in steps of 5) 108 cells: Mono S4 HC V xxx BF-DG (xxx=400-440 in steps of 5) Double Glass PV Modules with Half-cut 210mm TOPCon Monocrystalline Silicon Solar Cells: 132 cells: MS4 HC xxx BF-DGM TP PJ (xxx=660-705 in steps of 5) 120 cells: MS4 HC xxx BF-DGM TP PJ (xxx=600-640 in steps of 5) 60 cells: MS5 HC xxx BF-DG (xxx=300-320 in steps of 5)
General Information	
• Maximum System Voltage.... :	DC 1500V
• Electrical Protection Class.... :	N/A
• Fire Safety Class	Class A
Type of examination	Commission testing only
Testing Period	01/09/2024 - 01/11/2024
Testing Laboratory..... :	China Photovoltaic Product Test Center (CPTC) No.1, South side of Yanmi Road, economic development zone, Miyun District, Beijing, P.R. China.

Test results listed in this test report refer exclusively to the mentioned test sample.

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The submitted test samples as described in the reports hereunder is based on the following the requirements:

IEC 61730-2:2023 / EN IEC 61730-2:2023 + AC:2023 “Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing”

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Summary of testing

According to the enquiry of the applicant, a commission test was performed according to IEC 61730-2:2023 / EN IEC 61730-2:2023 + AC:2023. Testing items are listed in page 7 in this report.

List of related module types:

Double Glass PV Modules with Half-cut 182mm TOPcon Monocrystalline Silicon Solar Cells:

156 cells: Mono S4 HC V 615 BF-DG

144 cells: Mono S4 HC V xxx BF-DG (xxx=545-590 in steps of 5)

132 cells: Mono S4 HC V xxx BF-DG (xxx=495-540 in steps of 5)

120 cells: Mono S4 HC V xxx BF-DG (xxx=445-490 in steps of 5)

108 cells: Mono S4 HC V xxx BF-DG (xxx=400-440 in steps of 5)

Double Glass PV Modules with Half-cut 210mm TOPCon Mono-crystalline Silicon Solar Cells:

132 cells: MS4 HC xxx BF-DGM TP PJ (xxx=660-705 in steps of 5)

120 cells: MS4 HC xxx BF-DGM TP PJ (xxx=600-640 in steps of 5)

60 cells: MS5 HC xxx BF-DG (xxx=300-320 in steps of 5)

Since module type MONO S4 HC V 615 BF-DG is with the same design of above module series, and with the same BOM except size and number of solar cell. Therefore, MONO S4 HC V 615 BF-DG is selected as representative samples of above module types and conducted with test MST 23 Class A.

All tests were successfully completed.

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General remarks

Test item particulars:	
Accessories and detachable parts included in the evaluation	N/A
Options included	N/A
Abbreviations used in the report:	
HF - Humidity Freeze	TC - Temperature Cycling
DH - Damp Heat	Vmp - Maximum power voltage
Imp - Maximum power current	Voc - Open circuit voltage
Isc - Short circuit current	FF - Fill Factor
Pmax - Maximum power	α - Current temperature coefficient
NMOT - Nominal Module Operating Temperature	β - Voltage temperature coefficient
STC - Standard Test Conditions	γ - Power temperature coefficient
BNPI - Bifacial Nameplate Irradiance	BSI - Bifacial Stress Irradiance
CTI - Comparative Tracking Index	PTI - Proof Tracking Index
RTI - Relative Temperature Index	RTE - Relative Thermal Endurance index
TI - Temperature Index	DTI - Distance through insulation
CI - Clearances	Cr - Creepage distances
PD - Pollution Degree	MG - Material Groups
Possible test case verdicts:	
Test case does not apply to the test object	Not Applicable (N/A)
Test object does meet the requirement	Pass (P)
Test object does not meet the requirement	Fail (F)
Other remarks:	
<p>The test verdicts 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 testing laboratory.</p> <p>Sample #-front: Exposure under 1000W/m² on the front side with rear side covered by black cover. Sample #-rear: Exposure under 1000W/m² on the rear side with front side covered by black cover. Sample #-BNPI: Exposure under BNPI on the front side with rear side covered by black cover. Sample #-BSI: Exposure under BSI on the front side with rear side covered by black cover. Bifaciality coefficient $\phi = \min(I_{Sc_{rear}} / I_{Sc_{front}}, P_{max_{rear}} / P_{max_{front}}) \times 100\%$. Equivalent irradiance: $G_{BNPI} = 1000W/m^2 + \phi \times 135W/m^2$; $G_{BSI} = 1000W/m^2 + \phi \times 300W/m^2$.</p> <p>“(see Annex #)” refers to additional information appended to the report. “(see Table #)” refers to a table appended to the report.</p> <p>Power degradation data expressed in negative value indicates a reduction of maximum power output. Power degradation data expressed in positive value indicates an increment of maximum power output. Throughout this report, a point is used as the decimal separator.</p>	

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Module group assignment

Module type: MONO S4 HC V 615 BF-DG

Sample #	Serial number	Dimension (l x w x h) [mm]	Remark
1	M778W22123600003	2464 x 1134 x 35	Fire test, Class A
2	M778W22123600004	2464 x 1134 x 35	Fire test, Class A
3	M778W22123600005	2464 x 1134 x 35	Fire test, Class A

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Clause	Requirement + Test	Result - Remark	Verdict
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Test result overview

Module type: MONO S4 HC V 615 BF-DG

Initial examinations			-
MST01	Visual inspection	See table 10.2	P

Sample 1#, 2#, 3#			-
MST23	Fire test	See table 10.17	P

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IEC 61730-2 / EN IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict

Test results of IEC 61730-2 / EN IEC 61730-2

Module type: MONO S4 HC V 615 BF-DG

10.2 Visual inspection (initial) - MST01			-
Test date [MM/DD/YYYY].....:		01/09/2024	-
Sample #	Nature and position of initial findings - comments or attach photos		-
1	No visual defects		P
2	No visual defects		P
3	No visual defects		P
Supplementary information: N/A			

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IEC 61730-2 / EN IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
10.17 Fire test - MST23			-
Test date [MM/DD/YYYY].....:	01/11/2024		-
Standard applied	UL 1703, Class A		-
No. of modules provided to create the test assembly	2 for spread of flame test 1 for burning brand test		-
Sample #	Requirements		-
1	<input checked="" type="checkbox"/> Modules comply with the requirements for the fire test according to above noticed standard		P
2			
3			
Supplementary information: Please refer to Annex 3 for detailed pictures of the samples after test.			

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Annex 1: List of measurement equipment

Measurement / testing	Measuring equipment	Equipment ID	Calibration due date
Visual inspection	Visual inspection platform	GF-24 WGCS-1	10/23/2024
	Irradiance illuminometer	GF-28 1010A	12/20/2024
Fire test	PV module combustion test system	GF-112-1 SCF	05/23/2024
	Handheld anemometer	GF-112-2 TES-1340	05/28/2024
	Electric blast drying oven	GF-112-8	10/23/2024
	Electronic balance	GF-190 LBA-5200	03/05/2024
	Temperature and humidity recorder	GF-270-3 TH20R	11/05/2024
	Mechanical stopwatch	GF-120 803	09/17/2024

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Annex 2: Photos

Module type: MONO S4 HC V 615 BF-DG

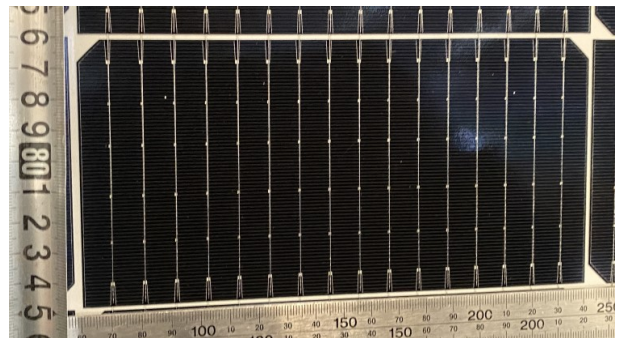


Front overview



Back overview

N/A



Solar cell

Label (Not stuck on PV modules)



Frame



Grounding Mark



Junction box (TL-BOX216x)



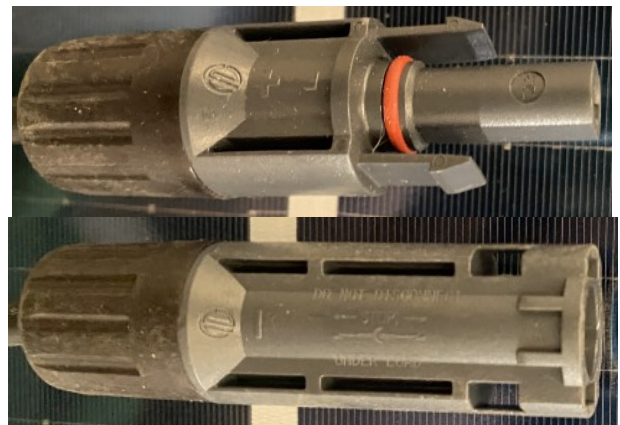
Junction box (opened)

N/A



Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)



Mark (Do not disconnect under load)

Connectors (Not specified)

Annex 3: Photos of fire test

Module type: MONO S4 HC V 615 BF-DG



Sample 1#: Spread of flame test (front)

Sample 1#: Spread of flame test (back)



Sample 2#: Spread of flame test (front)

Sample 2#: Spread of flame test (back)



Sample 3#: Burning brand test (front)

Sample 3#: Burning brand test (back)

----- End of test report -----