

Test Report



File No.: PVP10206/23P

Test Report No.: TRPVP10206/23P/01

Manufacturer	Solar Fabrik GmbH Hermann-Niggemann-Straße 7, D-63846 Laufach, Germany
Order No.....	QT-PVP10206/23P
Date of Application	11/10/2023
Product	Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
Module type(s).....	Double Glass PV Modules with Half-cut 182mm TOPCon Mono-crystalline Silicon Solar Cells: 120 cells: Mono S4 HC V XXX BF-DG (xxx = 445 - 490W in steps of 5) 132 cells: Mono S4 HC V XXX BF-DG (xxx = 490 - 540W in steps of 5) 144 cells: Mono S4 HC V XXX BF-DG (xxx = 535 - 590W in steps of 5) 108 cells: Mono S4 HC V XXX BF-DG TP (xxx = 440W) Double Glass PV Modules with Half-cut 210mm Mono-crystalline Silicon Solar Cells: 60 cells: MS5 HC V XXX BF-DG (xxx = 285-315W)
General Information • Maximum System Voltage.... • Electrical Protection Class.... • Fire Safety Class	1500V Class II N/A
Type of examination	Commission testing only
Testing Period	11/07/2023
Testing Laboratory.....	Shanghai Institute of Quality Inspection and Technical Research(SQI) No. 900, Jiangyue Road, Minhang District, Shanghai 201114, 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 are tested based on the requirements:
EN 12600: 2002 "Glass in building - Pendulum test - Impact test method and classification for flat glass"

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Summary of testing

According to the enquiry of the applicant, a commission test was performed according to EN 12600 for photovoltaic modules with mono-crystalline silicon half-cut solar cells.

Mono S4 HC V XXX BF-DG was selected as representative test samples and conducted with all the related tests. Compared with the certified module types, the materials, structure and process of the representative sample are exactly the same, but only the size is different.

Mono S4 HC V XXX BF-DG construction: 2mm pattern toughened glass+0.5mm clear EVA+0.175mm Crystalline silicon cell+0.5mm clear POE+2mm pattern toughened glass.

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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:	
BIPV - Building-Integrated Photovoltaic Modules	
R - sound reduction index	R_w - weighted sound reduction index
C - spectrum adaptation term for A-weighted pink noise	C_{tr} - Spectrum adaptation term for A-weighted urban traffic noise
h_i - internal surface heat transfer coefficient	h_e - external surface heat transfer coefficient
u values - Thermal transmittance	g value - Total solar energy transmittance (solar factor)
τ - transmittance	ρ - reflectance
α - absorptance	U - thermal transmittance of the glazing
g_{tot} - the solar factor of the combination of glazing and solar protection device	N/A
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)
Test results for the parameter does not contain a non-compliance	Compliant
Test results for the parameter contain more than one non-compliance	Non-compliant
Other remarks:	
<p>The test verdicts presented in this report relate only to the object tested.</p> <p>This report shall not be reproduced except in full, without the written approval of the issuing testing laboratory.</p> <p>“(see Annex #)” refers to additional information appended to the report.</p> <p>“(see Table #)” refers to a table appended to the report.</p> <p>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 XXX BF-DG

Sample #	Serial number	Dimension (l x w x h) [mm]	Remark
1	N/A	1938 x 876 x 5.38	N/A
2	N/A	1938 x 876 x 5.36	N/A
3	N/A	1938 x 876 x 5.35	N/A
4	N/A	1938 x 876 x 5.37	N/A
5	N/A	1938 x 876 x 5.39	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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Test result overview

Module type: Mono S4 HC V XXX BF-DG

Sample 1#, 2#, 3#, 4#, 5#			-
EN 12600	Pendulum test..... :	See table ISO 12543-2 Clause 4	P

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EN 12600			
Clause	Requirement + Test	Result - Remark	Verdict

Test results of EN 50583-1

Module type: Mono S4 HC V XXX BF-DG

EN 12600 Pendulum test			-
Test date [MM/DD/YYYY].....:	11/07/2023		-
α: the highest drop height class at which the product either did not break or broke in accordance with a) or b) of clause 4.:	<input checked="" type="checkbox"/> Did not break <input checked="" type="checkbox"/> Broke in accordance with 4 (a) <input type="checkbox"/> Broke in accordance with 4 (b) <input checked="" type="checkbox"/> Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3		-
β: Mode of breakage	<input type="checkbox"/> Type A <input checked="" type="checkbox"/> Type B <input type="checkbox"/> Type C		-
φ: the highest drop height class at which the product either did not break or when it did break, broke in accordance with a) clause	<input checked="" type="checkbox"/> Did not break <input checked="" type="checkbox"/> Broke in accordance with 4 (a) <input type="checkbox"/> Class 0 <input checked="" type="checkbox"/> Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3		-
Performance classification α(β)φ	1(B)1		-
Weight of particles in case of breakage [g].....:	N/A		-
Sample #	Drop height (mm)	Requirements	-
1	190	<input checked="" type="checkbox"/> it remains unbroken <input type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
2	190	<input checked="" type="checkbox"/> it remains unbroken <input type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
3	190	<input checked="" type="checkbox"/> it remains unbroken <input type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
4	190	<input checked="" type="checkbox"/> it remains unbroken <input type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
1	450	<input checked="" type="checkbox"/> it remains unbroken <input type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
2	450	<input type="checkbox"/> it remains unbroken <input checked="" type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
3	450	<input checked="" type="checkbox"/> it remains unbroken <input type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P

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EN 12600			
Clause	Requirement + Test	Result - Remark	Verdict
4	450	<input checked="" type="checkbox"/> it remains unbroken <input type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
1	1200	<input type="checkbox"/> it remains unbroken <input checked="" type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
3	1200	<input type="checkbox"/> it remains unbroken <input checked="" type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
4	1200	<input checked="" type="checkbox"/> it remains unbroken <input type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
5	1200	<input type="checkbox"/> it remains unbroken <input checked="" type="checkbox"/> it broke in accordance with either the requirements of 4 (a) or 4 (b) <input type="checkbox"/> it broke and failed to conform to the requirements of 4 (a) or 4 (b)	P
Supplementary information: N/A			

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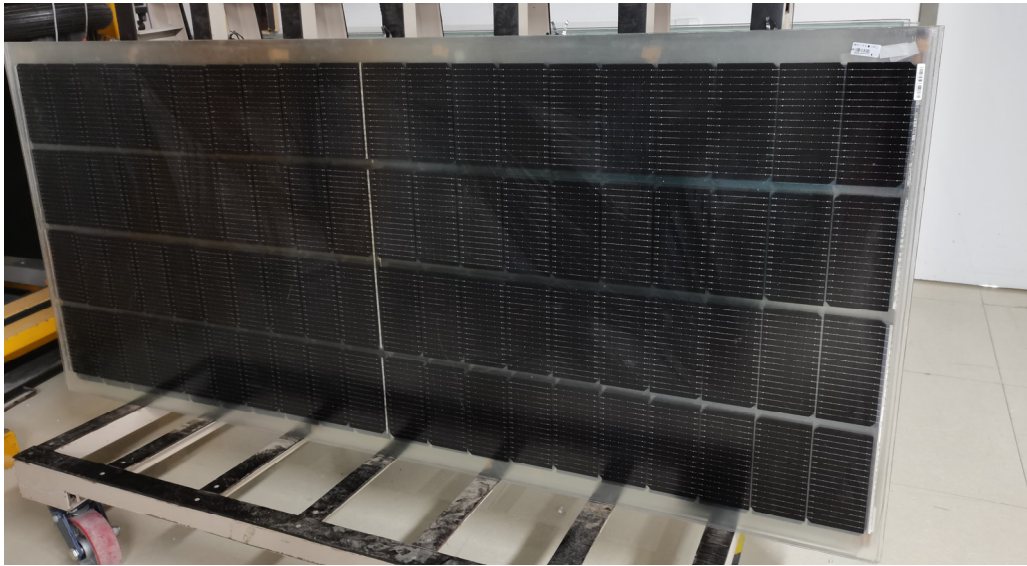
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Annex 1: List of measurement equipment

Measurement / testing	Measuring equipment	Equipment ID	Calibration due date
Pendulum test	Pendulum impact test apparatus	QG-A-A2-0038	07/27/2024
	Micrometer	QG-B-A1-0010	01/03/2024
	Tower rule	QG-B-A1-0058	05/09/2023

Annex 2: Photos



Mono S4 HC V XXX BF-DG

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