Technical Report No.: 077-2519823-000

Date: 2023-11-06

Client:	HD HYUNDAI ENERGY SOLUTIONS CO., LTD.	
Test object:	Product:	Photovoltaic Module
	Model:	HiT-HxxxOF-BF, xxx = 430 to 450 in step of 5 HiT-HxxxMF-FB, xxx = 430 to 445 in step of 5 HiT-HxxxOI, xxx = 580 to 600 in step of 5 HiT-H440OF-BF was selected as the representative model which can cover all above listed models. There are differences between the listed models but not required retest of hail test according to IEC TS 62915:2023
Test specification:	IEC 61215-1:2021, IEC 61215-1-1:2021, IEC 61215-2:2021, MQT 17 Hail test	
Purpose of examination:	• Testing and evaluation (visual / partial) according to the test specification	
Test result:	The test results show that the presented product is in compliance with the above listed test specifications.	

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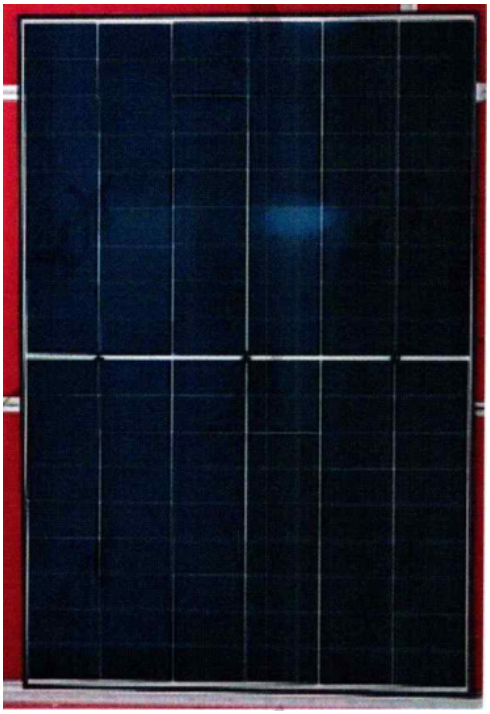
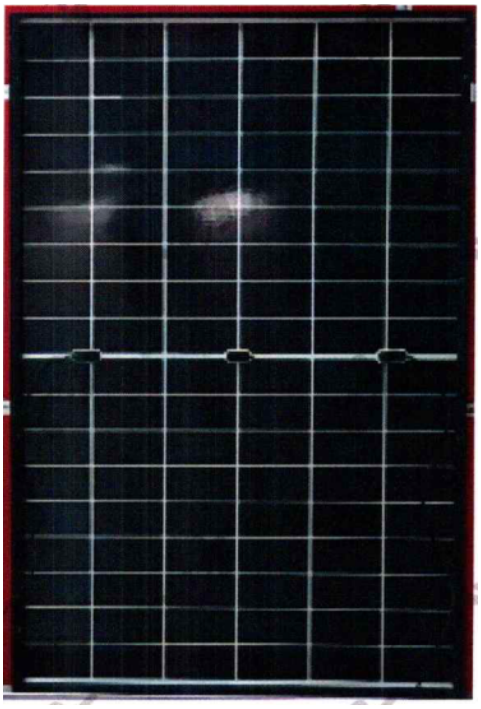
1. Description of the test object

1.1 Picture(s)

Font



Back



1.2 Function

Manufacturer's specification for intended use:

- For both residential and commercial applications.

1.3 Consideration of the foreseeable us

☐ Not applicable
☒ Covered through the applied standard
☐ Covered by the following comment*
☐ Covered by attached risk analysis
*

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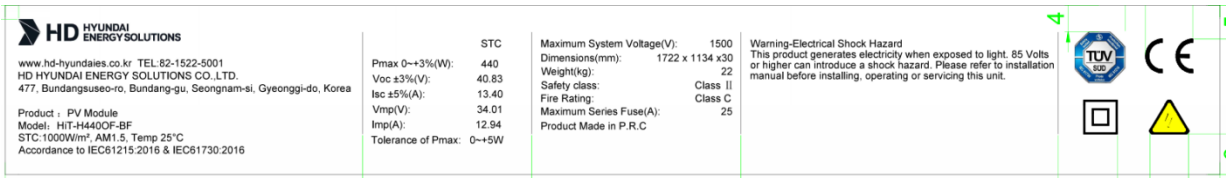
1.4 Technical Data



2. Order

2.1 Date of Purchase Order, Customer's Reference

2023-09-04

2.2 Test Sample(s)

- Reception date(s): 2023-09-18
- Location(s) of reception: Yangzhou Opto-Electrical Products Testing Institute(YOT)
  No. 10 West Kaifa Road, Yangzhou, 225009 Jiangsu, P. R. China.
- Condition of test sample(s): No major defect found

2.3 Testing

- Testing date(s): 2023-09-22 to 2023-10-26
- Location(s) of testing: Yangzhou Opto-Electrical Products Testing Institute(YOT)
  No. 10 West Kaifa Road, Yangzhou, 225009 Jiangsu, P. R. China.

2.4 Points of Non-Compliance or Exceptions of the Test Procedure

- None

3. Test Results

Sample No.	Serial no.
1	HBB23085400524
2	HBB23085400465

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3	HBB23085400510
4	HBB23085400069
5	HBB23085400611

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TABLE 01: MQT 01 ini: Initial Visual inspection		P
Test Date [YYYY-MM-DD] .....:	2023-09-22	—
Sample #	Nature and position of initial findings – comments or attach photos	—
1	No major visual defect found	P
2	No major visual defect found	P
3	No major visual defect found	P
4	No major visual defect found	P
Supplementary information: N/A		

TABLE 02: MQT 19.1 ini: Initial stabilization							P
TABLE 02.1: MQT 06.1 ini: Performance at STC before initial stabilization (Front side)							P
Test Date [YYYY-MM-DD] .....:	2023-09-22						—
Test method .....:	■Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
1	13.279	40.516	12.479	34.968	436.379	81.11	P
2	13.429	40.517	12.489	34.637	432.583	79.50	P
3	13.149	40.603	12.518	34.657	433.847	81.26	P
4	13.241	40.593	12.522	34.766	435.335	80.99	P
5	13.169	40.607	12.470	35.058	437.168	81.75	P
Supplementary information: N/A							
TABLE 02.2: MQT 06.1 ini: Performance at STC before initial stabilization (Back side)							P
Test Date [YYYY-MM-DD] .....:	2023-09-22						—
Test method .....:	■ Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
1	11.873	40.368	10.918	35.167	383.965	80.11	P
2	11.547	40.331	10.819	35.079	379.514	81.49	P
3	11.659	40.468	10.816	35.257	381.345	80.83	P
4	11.557	40.479	10.824	35.286	381.942	81.64	P
5	11.796	44.247	10.718	38.142	408.799	78.33	P

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Supplementary information: N/A							
TABLE 02.3: MQT 06.1 ini: Performance at BNPI (front side irradiance 1 000 W/m², back side irradiance 135 W/m², 25 °C, AM 1.5) before initial stabilization							P
Test Date [YYYY-MM-DD] .....:	2023-09-22						—
Test method .....:	■ Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
1	14.807	40.606	14.009	34.769	487.080	81.01	P
2	14.596	40.708	13.921	34.732	483.496	81.37	P
3	14.549	40.704	13.975	34.614	483.730	81.68	P
4	14.523	40.717	13.995	34.850	487.739	82.48	P
5	14.523	40.717	13.995	34.850	487.739	82.48	P
Supplementary information: N/A							

TABLE 02.4: MQT 19.1: Initial Stabilization procedure							P
Light exposure method .....:	■ Solar simulator ☐ Natural sunlight						
Stabilization criterion x per IEC 61215-1-x .....:	1						
Sample #	1f	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22 / 2023-09-24		
Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	$(P_{max} - P_{min}) / P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	436.3787	—	—
1	5	800~1000	50±10	MPPT	435.1276	—	—
2	5	800~1000	50±10	MPPT	434.3479	0.467	Yes
Sample #	1b	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22 / 2023-09-24		
Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	$(P_{max} - P_{min}) / P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	383.9651	—	—
1	5	800~1000	50±10	MPPT	383.0378	—	—
2	5	800~1000	50±10	MPPT	382.3881	0.412	Yes

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Sample #	1dx	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22 / 2023-09-24		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	($P_{max} - P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	487.0801	—	—
1	5	800~1000	50±10	MPPT	486.3201	—	—
2	5	800~1000	50±10	MPPT	484.4519	0.541	Yes
Sample #	2f	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22 / 2023-09-24		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	($P_{max} - P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	432.5832	—	—
1	5	800~1000	50 ±10	MPPT	432.4596		
2	5	800~1000	50±10	MPPT	432.014	0.132	Yes
Sample #	2b	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22 / 2023-09-24		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	($P_{max} - P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	379.5137	—	—
1	5	800~1000	50±10	MPPT	378.2488	—	—
2	5	800~1000	50±10	MPPT	377.4565	0.544	Yes
Sample #	2dx	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22 / 2023-09-24		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	($P_{max} - P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	483.4956	—	—
1	5	800~1000	50±10	MPPT	482.729	—	—
2	5	800~1000	50±10	MPPT	481.8524	0.340	Yes
Sample #	3f	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22/2023-09-24		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	($P_{max} - P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	433.8474	—	—

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1	5	800~1000	50±10	MPPT	433.114	—	—
2	5	800~1000	50±10	MPPT	432.2104	0.378	Yes
Sample #	3b	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22/2023-09-24		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	381.3452	—	—
1	5	800~1000	50±10	MPPT	380.7161	—	—
2	5	800~1000	50±10	MPPT	380.2674	0.283	Yes
Sample #	3dx	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22/2023-09-24		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	438.7297	—	—
1	5	800~1000	50±10	MPPT	482.9832	—	—
2	5	800~1000	50±10	MPPT	482.3145	0.293	Yes
Sample #	4f	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22/2023-09-24		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	435.3349	—	—
1	5	800~1000	50±10	MPPT	434.6934	—	—
2	5	800~1000	50±10	MPPT	433.9915	0.309	Yes
Sample #	4b	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22/2023-09-24		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	381.9415	—	—
1	5	800~1000	50±10	MPPT	381.301	—	—
2	5	800~1000	50±10	MPPT	380.2853	0.434	Yes
Sample #	4dx	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22/2023-09-24		
Test cycle	Integrated irradiation	Irradiance (W/m^2)	Module temperature	Resistive load	P_{max} (W) at the end	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)

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	(kWh/m²)		(°C)		of cycle		
Initial	—	—	—	—	485.7294	—	—
1	5	800~1000	50±10	MPPT	484.715	—	—
2	5	800~1000	50±10	MPPT	481.5551	0.862	Yes
Sample #	5f	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22/2023-09-24		
Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	$(P_{max} - P_{min}) / P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	437.1678	—	—
1	5	800~1000	50±10	MPPT	436.2565	—	—
2	5	800~1000	50±10	MPPT	435.6549	0.347	Yes
Sample #	5b	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22/2023-09-24		
Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	$(P_{max} - P_{min}) / P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	408.7988	—	—
1	5	800~1000	50±10	MPPT	408.0066	—	—
2	5	800~1000	50±10	MPPT	407.4859	0.322	Yes
Sample #	5dx	Test Date (YYYY-MM-DD) start/end .....:			2023-09-22/2023-09-24		
Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	$(P_{max} - P_{min}) / P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	487.7392	—	—
1	5	800~1000	50±10	MPPT	485.6925	—	—
2	5	800~1000	50±10	MPPT	484.9814	0.567	Yes

Supplementary information:
f: frond
b: back
dx: bi-facial.

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TABLE 03.2: MQT 06.1: Performance at STC after initial stabilization (front side)							P
Test Date [YYYY-MM-DD] .....:	2023-09-24						—
Test method .....:	■ Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
1	13.280	40.343	12.479	34.806	434.348	81.07	P
2	13.070	40.522	12.497	34.569	432.014	81.53	P
3	13.149	40.461	12.516	34.533	432.210	81.24	P
4	13.220	40.454	12.541	34.606	433.992	81.15	P
5	13.184	40.478	12.469	34.938	435.655	81.63	P
Supplementary information: N/A							

TABLE 03.2: MQT 06.1: Performance at STC after initial stabilization (Back side)							P
Test Date [YYYY-MM-DD] .....:	2023-09-24						—
Test method .....:	■ Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
1	11.870	40.184	10.913	35.039	382.388	80.17	P
2	11.583	40.134	10.794	34.968	377.457	81.19	P
3	11.184	40.468	10.785	35.260	380.267	84.02	P
4	11.548	40.346	10.800	35.211	380.285	81.62	P
5	12.920	43.850	10.841	37.587	407.486	71.91	P
Supplementary information: N/A							

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TABLE 03.2: MQT 06.1: Performance at BNPI (front side irradiance 1 000 W/m², backside irradiance 135 W/m², 25 °C, AM 1.5) after initial stabilization							P
Test Date [YYYY-MM-DD] .....:	2023-09-24						—
Test method .....:	■ Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
1	14.819	40.427	13.998	34.609	484.452	80.86	P
2	14.556	40.579	13.954	34.531	481.852	81.58	P
3	14.592	40.586	13.983	34.492	482.315	81.44	P
4	14.222	40.559	13.866	34.729	481.555	83.48	P
5	14.239	40.717	13.787	35.178	484.981	83.65	P
Supplementary information: N/A							

TABLE 04: MQT 03: Initial Insulation test				P
Test Date [YYYY-MM-DD].....:	2023-09-26			—
Test Voltage applied [V] .....:	8000/1500			—
Size of module [m²].....:	1.95			—
Required Resistance [MΩ].....:	20.51			—
Sample #	Measured	Dielectric breakdown		Result
	MΩ	Yes (description)	No	
1	5211		√	P
2	5039		√	P
3	4981		√	P
4	4893		√	P
5	5106		√	P
Supplementary information: N/A				

TABLE 05: MQT 15: Initial Wet leakage current test		P
Test Date [YYYY-MM-DD] .....:	2023-09-26	—

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Test Voltage applied [V].....:	1500	—
Solution temperature [°C].....:	22.8	—
Solution resistivity [Ω cm] .....:	2729	—
Size of module [m²].....:	1.95	—

Sample #	Required Resistance [MΩ]	Measured [MΩ]	Result
1	20.51	5296	P
2	20.51	5121	P
3	20.51	4993	P
4	20.51	5029	P
5	20.51	5146	P

Supplementary information: N/A

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TABLE 6: MQT 17 - Hail impact test							P
Test Date [YYYY-MM-DD].....:	2023-10-05						—
Sample #	4						—
Ice ball size [mm].....:	1	2	3	4	5	6	—
	25.1	24.7	25.1	24.9	24.9	25.1	
	7	8	9	10	11		
	24.8	24.7	25.1	25.0	25.1		
Ice ball weight [g].....:	1	2	3	4	5	6	—
	7.4	7.36	7.43	7.38	7.39	7.43	
	7	8	9	10	11		
	7.33	7.38	7.39	7.49	7.4		
Ice ball velocity [m/s] .....:	1	2	3	4	5	6	—
	22.93	22.7	22.73	22.92	22.87	22.39	
	7	8	9	10	11		
	22.90	22.94	22.46	22.37	22.94		
Number of impact locations.....:	11						—

Supplementary information: (impact location descriptions)
Ice ball diameter: 25 mm ± 5%

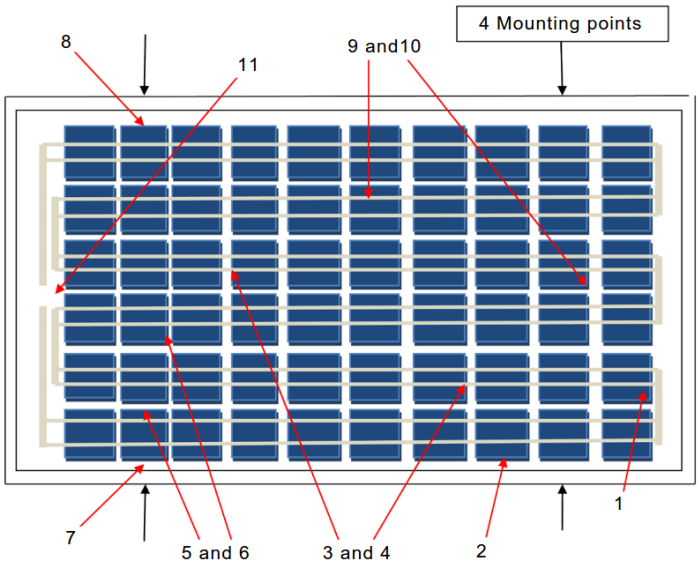

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TABLE 6: MQT 17 - Hail impact test							P
Test Date [YYYY-MM-DD].....:	2023-10-23						—
Sample #	3						—
Ice ball size [mm].....:	1	2	3	4	5	6	—
	30.0	29.8	29.6	29.9	29.7	29.6	
	7	8	9	10	11		
	30.0	29.8	29.8	30.0	29.6		
Ice ball weight [g].....:	1	2	3	4	5	6	—
	12.17	12.33	12.95	11.92	13.45	12.12	
	7	8	9	10	11		
	12.94	13.39	12.31	12.74	13.40		
Ice ball velocity [m/s] .....:	1	2	3	4	5	6	—
	23.91	23.84	23.91	23.87	23.92	23.84	
	7	8	9	10	11		
	23.85	23.89	23.89	23.85	23.90		
Number of impact locations.....:	11						—

Supplementary information: (impact location descriptions)
Ice ball diameter: 30 mm ± 5%

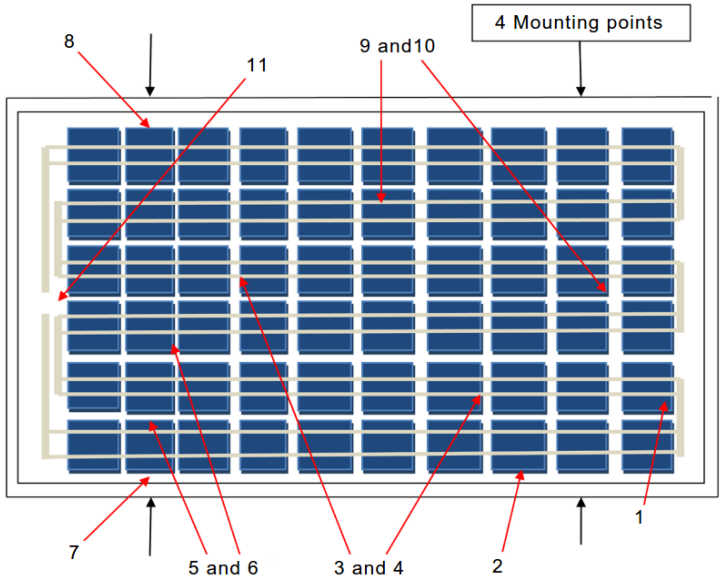

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TABLE 6: MQT 17 - Hail impact test							P
Test Date [YYYY-MM-DD].....:	2023-10-06						—
Sample #	5						—
Ice ball size [mm].....:	1	2	3	4	5	6	—
	34.9	35.1	34.6	35.1	34.9	35.0	
	7	8	9	10	11		
	34.5	34.7	34.9	34.6	34.6		
Ice ball weight [g].....:	1	2	3	4	5	6	—
	20.47	20.36	20.44	20.32	20.36	20.36	
	7	8	9	10	11		
	20.50	20.47	20.41	20.48	20.37		
Ice ball velocity [m/s] .....:	1	2	3	4	5	6	—
	26.88	26.50	26.50	26.13	26.59	26.98	
	7	8	9	10	11		
	26.03	26.78	26.79	26.68	26.66		
Number of impact locations.....:	11						—

Supplementary information: (impact location descriptions)
Ice ball diameter: 35 mm ± 5%

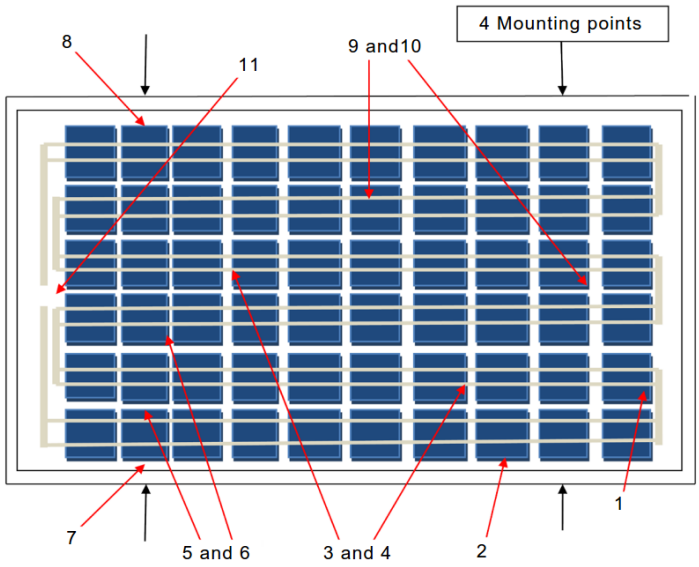

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TABLE 6: MQT 17 - Hail impact test							P
Test Date [YYYY-MM-DD].....:	2023-10-26						—
Sample #	2						—
Ice ball size [mm].....:	1	2	3	4	5	6	—
	39.6	39.7	39.8	40.0	39.7	39.8	
	7	8	9	10	11		
	40.0	39.8	39.7	39.6	39.6		
Ice ball weight [g].....:	1	2	3	4	5	6	—
	26.68	30.79	30.53	29.42	29.99	28.39	
	7	8	9	10	11		
	30.81	30.22	29.28	29.31	31.90		
Ice ball velocity [m/s] .....:	1	2	3	4	5	6	—
	27.48	27.51	27.45	27.45	27.46	27.46	
	7	8	9	10	11		
	27.48	27.48	27.49	27.47	27.47		
Number of impact locations.....:	11						—

Supplementary information: (impact location descriptions)
Ice ball diameter: 40 mm ± 5%

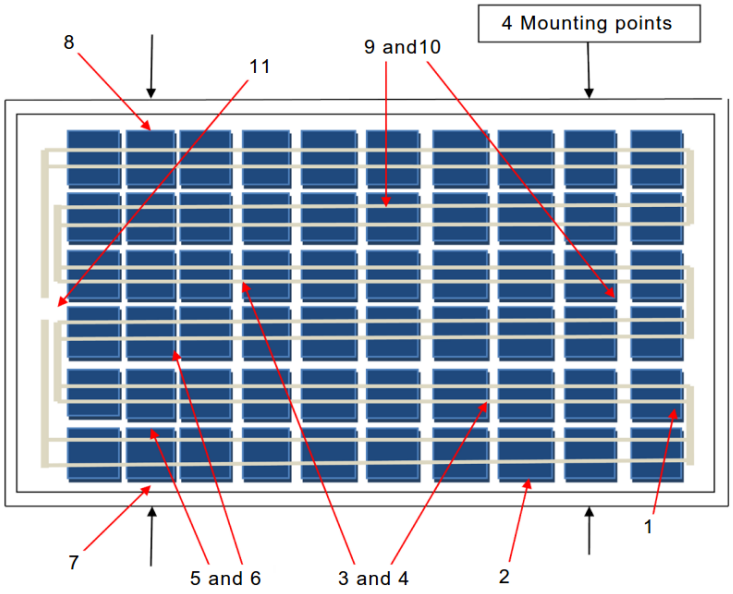

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TABLE 7: MQT 01 - Visual inspection after hail impact test		P
Test Date [YYYY-MM-DD] .....:	2023-10-26	—
Sample #	Nature and position of initial findings – comments or attach photos	—
2	No major defect found	P
3	No major defect found	P
4	No major defect found	P
5	No major defect found	P
Supplementary information: N/A		

TABLE 8: MQT 15 - Wet leakage current test after hail impact test			P
Test Date [YYYY-MM-DD].....:	2023-10-26		—
Test Voltage applied [V] .....:	1500		—
Solution temperature [°C].....:	22.4		—
Size of module [m²].....:	1.95		—
Solution resistivity [Ω cm] .....:	2805		—
Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
2	4935	20.51	P
3	4889	20.51	P
4	5118	20.51	P
5	5068	20.51	P
Supplementary information: N/A			

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TABLE 9: MQT 02 – Max. power determination after Hail impact test							P
TABLE 09.1: MQT 06.1 ini: Performance at STC before initial stabilization (Front side)							P
Test Date [YYYY-MM-DD] .....:			2023-10-26				—
Test method .....:			■ Solar simulator ☐ Natural sunlight				
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	—
2	13.078	40.526	12.498	34.575	432.118	81.53	P
3	13.153	40.448	12.491	34.458	430.415	80.90	P
4	13.229	40.429	12.481	34.406	429.421	80.29	P
5	13.186	40.458	12.430	34.727	431.657	80.91	P
Supplementary information: N/A							
TABLE 09.2: MQT 06.1 ini: Performance at STC before initial stabilization (Back side)							P
Test Date [YYYY-MM-DD] .....:			2023-10-26				—
Test method .....:			■ Solar simulator ☐ Natural sunlight				
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	—
2	11.580	40.136	10.798	34.967	377.574	81.24	P
3	11.182	40.460	10.786	35.179	379.441	83.87	P
4	11.546	40.322	10.728	35.053	376.049	80.77	P
5	12.926	43.830	10.819	37.379	404.403	71.38	P
Supplementary information: N/A							
TABLE 09.3: MQT 06.1 ini: Performance at BNPI (front side irradiance 1 000 W/m2, back side irradiance 135 W/m2, 25 °C, AM 1.5) before initial stabilization							P
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	—
2	14.561	40.583	13.958	34.523	481.872	81.54	P
3	14.588	40.568	13.994	34.381	481.128	81.30	P
4	14.217	40.530	13.855	34.500	477.998	82.95	P
5	14.233	40.694	13.793	34.962	482.231	83.26	P
Supplementary information: N/A							

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TABLE 10: MQT 03 - Insulation test after Hail impact test					P
Test Date [YYYY-MM-DD] .....:			2023-10-26		—
Test Voltage applied [V] .....:			8000/1500		—
Size of module [m²]			1.95		—
Sample #	Measured	Required Resistance	Dielectric breakdown		Result
	[MΩ]	[MΩ]	Yes (description)	No	
2	4925	20.51		√	P
3	5291	20.51		√	P
4	5019	20.51		√	P
5	5107	20.51		√	P
Supplementary information: N/A					

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Test Equipment

Equipment Number	Name	Calibration Validity
SB18003	Pulsed solar simulator	2024.09.20
SB08111	Magnifying lamp	--
SB08092	Camera	--
SB08102	Steel tape	2024.08.16
SB08125	Light Meter	2024.08.16
SB23002	Electrical Safety compliance Analyzer	2024.04.26
SB08076	Hail tester	2024.08.22
SB08105	Vernier calliper	2024.08.16
SB08143	Freezer	2024.08.16
SB10036	Electronic balance	2024.07.25
SB08142	Freezer	2024.08.16

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Description of module construction: (Manufactories and part numbers, unless otherwise specified)	
Sample .....:	Random sampling from production ☒ Prototype submitted by client ☐
Module	
Front Cover.....:	Supplier: Hunan Kibing Solar Technology Co., Ltd Type: Semi-tempered glass , Thickness:1.6 mm
Rear Cover .....:	Supplier: Hunan Kibing Solar Technology Co., Ltd Type: White-grid semi-tempered glass, Thickness:1.6 mm
Encapsulation material .....:	Supplier: Cybrid Technologies Inc. -Front side: WT11, Thickness : 0.60 mm -Back side T11, Thickness : 0.60 mm
Frame .....:	Supplier: Anhui Huilong Group Hui aluminum new material technology Material: Aluminum 6005
Dimensions (l x w x h) [mm] .....:	1722 x 1134 x 30
Module area [m²] .....:	1.95m^2
Adhesives (junction box) .....:	Supplier: Shanghai Huitian New Chemical Co., Ltd. Type: HT906Z
Cell	
Cell (include type).....:	Supplier: ANHUI HUASUN ENERGY Co. , Ltd Type: 182-18BB HJT solar cells ,
Cells (l x w) [mm] .....:	182.00mm x 91.75 mm,
Cell thickness [µm] .....:	130±13 µm
Cell area [cm²] .....:	166.99 cm^2
Number of cells.....:	108
Components and other	
Cells per bypass diode .....:	36/36/36
Type of bypass diode .....:	Supplier: Ningbo Huayu Photovoltaic Energy Co.,Ltd Type: HY4050MK

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No. of bypass diodes .....:	3
Cell- and string connectors.....:	Cell connector Supplier: YAN CHENG STATE-OWNED NEW MATERIAL Co.,Ltd Type: 4× 0.4mm (width × thickness) String connector Supplier: YAN CHENG STATE-OWNED NEW MATERIAL Co.,Ltd Type: φ0.28mm (Dimension)
Soldering material .....:	Supplier: Asahi TypeL: Flux (liquid)
Junction box .....:	Supplier: Ningbo Huayu Photovoltaic Technology Co. , Ltd Type: PV-HY02
Cable .....:	Supplier: Ningbo Huayu Photovoltaic Technology Co. , Ltd Type:62930 IEC 131
Connectors .....:	Supplier: Ningbo Huayu Photovoltaic Technology Co. , Ltd Type: PV-H4
Adhesives (frame) .....:	Supplier: Shanghai Huitian New Chemical Co., Ltd. Type: HT906Z
Potting material (junction box).....:	Supplier: Shanghai Huitian New Chemical Co., Ltd. Type: 5299W-S

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4. Remarks

4.1 General

The user manual has been examined according to the minimum requirements described in the product standard. The manufacturer is responsible for the accuracy of further particulars as well as of the composition and layout.

4.2 Factory surveillance cycle

Your production facility is currently on the following surveillance cycle.

☐ Annual (12 month)

☐ Bi-Annual (6 month)

☐ Quarterly (3 month)

☒ N/A

5. Summary

"The test specifications are met"

TÜV SÜD Korea

Tested by:

In-Seop Lee / Project handler

Approved by:

Hwi-Jun Lim / Project reviewer.

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