Technical Information Service Report

TIS Report: 80218376-2
Date: December 6, 2024

CLIENT: PT LESSO NEW ENERGY.
Kawasan Industri JIPS blok D, Jalan Raya Semarang - Demak KM 14.7
Desa/Keturah, Batu, Kec.Karangtengah,kab.Demak
Demak Regency, Jawa Tengah 59561, Indonesia

Attention: Qin wu, R&D Manager

Issued by: Sara Guo

SUBJECT: California Energy Commission Listing Testing for PV modules；
FLORIDA SOLAR ENERGY CENTER Listing Testing for PV modules

APPLICABLE REQUIREMENTS:

IEC 61215 2nd, Crystalline silicon terrestrial photovoltaic (PV) modules – Design qualification and type approval, 2005
10.2 Maximum power determination
10.3 Insulation test
10.4 Measurement of temperature coefficients
10.5 Measurement of nominal operating cell temperature (NOCT)
10.6 Performance at STC and NOCT
10.7 Performance at low irradiance

ASSESSMENT:
Please supply a copy of this information when filing an application for CSA Certification related to the SUBJECT, as it may aid the investigation.

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Telephone: (86)21.33688282 Fax: (86)21.33688122 www.csagroup.org

General product information provided by client.

Model Type	430C(HBB)54(182)
Max system voltage (V)	1500
Max open circuit voltage: Voc (V)	40.13
Short circuit current: Isc (A)	14.82
Vmp (V)	31.69
Imp (A)	13.57
Pmp (W)	430 ± 3%
Nominal power (W)	430 ± 3%
Total number cells	108
Number of cells in Series strings	54
Number of parallel strings	2
Number of cells per bypass diode	36
Number of bypass diode	3
Module dimension(mm)	1722*1134*35
Cell Technology	N type Mono-Si

1. TEST SAMPLE IDENTIFICATION:

No.	Customer Series No.	Sample Card No.	Model Type
1#	BHH061EBF240308050002	HA2024L-1852-001X	430C(HBB)54(182)

2. SAMPLE ALLOCATION

Section	Tested Model	Test name as in IEC61215
10.5	430C(HBB)54(182)1#	NOCT Determination
10.4		Temperature Coefficient (including βVoc, βVpmax, αIsc, γPmax)
10.2 /10.6		Performance at STC Maximum power determination
10.6		Performance at NOCT.
10.7		Performance at low irradiance

3. EQUIPMENT LIST

Equipment Name	Equipment ID	Test item	Calibration Due Date
Flash Simulator	HYJC-YS-021	10.5, 10.4, 10.2, 10.6,10.7	2025-01-23
Temperature Controller	HYJC-YS-123	10.4, 10.6	2024-08-07
NMOT test system	HYJC-YS-067	10.5	2024-08-07
Anemometer	HYJC-LJ-091	10.5	2025-01-25
Anemoscope	HYJC-LJ-091	10.5	2025-01-25
Pyranometer	HYJC-YS-366	10.5	2024-08-29
Angle Gauge	HYJC-LJ-006	10.5	2025-06-19

4. TEST RESULTS

Maximum Power Determination

Sample No	Voc (V)	Vmp (V)	Isc (A)	Imp (A)	Pmp (W)	FF (%)
430C(HBB)54(182)1#	39.977	33.833	13.454	12.844	434.562	80.80

Measurement of Temperature Coefficients

Radiant Source	☒ Solar Simulator	☐ Natural Sunlight
Irradiance(W/m^2)	1000	
Range of module temperature (high/low) (°C)	25 to 55	
Parameter	Sample #	Calculated Value
Current: αIsc (%/°C)	430C(HBB)54(182)1#	0.0468
Voltage: βVoc (%/°C)		-0.2324
Current: αIpmax(%/°C)		0.0023
Voltage: βVpmax((%/°C)		-0.2758
Peak Power: γPmax (%/C)		-0.2781

Measurement of NOCT

430C(HBB)54(182)1#

Parameter	2024-07-16	2024-07-18	2024-07-23
Tamb Min (°C)	30.80	30.14	30.96
Tamb Max (°C)	34.46	34.29	34.52
Tamb Avg (°C)	32.48	32.45	32.22
Wind Velocity Min (m/s)	0.56	0.47	0.33
Wind Velocity Max (m/s)	1.35	1.14	1.42
Wind Velocity Avg (m/s)	0.95	0.81	0.86
Irradiance Min (W/m^2)	814.77	781.86	724.81
Irradiance Max (W/m^2)	963.36	979.58	949.45
Module Temp Min (°C)	55.88	55.49	56.25
Module Temp Max (°C)	60.38	60.70	60.75
NOCT Correction Factor	1	1	1
Calculated NOCT (°C)	46.04	46.45	46.59
Average NOCT (°C)	46.36		

Performance at STC: (1000 W/m2, 25℃, AM 1.5)

Sample No	Voc (V)	Vmp (V)	Isc (A)	Imp (A)	Pmp (W)	FF (%)
430C(HBB)54(182)1#	39.977	33.833	13.454	12.844	434.562	80.80

Performance at NOCT: (800 W/m2, NOCT)

Sample No	Voc (V)	Vmp (V)	Isc (A)	Imp (A)	Pmp (W)	FF (%)
430C(HBB)54(182)1#	38.476	31.547	10.762	10.226	322.609	77.91

Performance at Low Irradiance: (200 W/m2, 25℃, AM 1.5)

Sample No	Voc (V)	Vmp (V)	Isc (A)	Imp (A)	Pmp (W)	FF (%)
430C(HBB)54(182)1#	38.547	33.228	2.692	2.564	85.187	82.09

Appendix 1: Photos of Modules

430C(HBB)54(182)1#

Fig.1, Front view of module type

Fig. 2, Rear view of module type

Appendix II: Component list of Modules

430C(HBB)54(182)

Item	Manufacturer	Model	Type
Superstrate	XINYI SOLAR (MALAYSIA) SDN.BHD.	AR Coated Tempered Glass	3.2 mm
Encapsulation	BETTERIAL (VIET NAM) FILM TECHNOLOGY COMPANY LIMITED	POE EVA	B602 B602MP
Substrate	VINA EVERGREEN ADVANCED MATERIAL COMPANY LIMITED	Fluorocarbon coating/ PET/ Fluorocarbon coating	PV308C-TW, transparent, black mesh
Cell	SolarSpace Technology Co., Ltd	M18216BTP10	(182±0.25)mm*(182±0.25)mm 130μm±13μm thickness
Junction box	QC SOLAR (VIET NAM) ELECTRONIC COMPANY LIMITED	3Qxy	1500V DC, 30A
Module size (mm)	1722*1134*35		
Number of cells	108		
Number of strings	3		

---End of Report---