Test Report issued under the responsibility of:

TEST REPORT
IEC 61730 series:2016
Photovoltaic (PV) Module Safety Qualification

Report Number..... :	492012695.015 part 2 of 2
Date of issue ..... :	2024-08-12
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Applicant's name ..... :	**Tongwei Co., Ltd.**
Address..... :	No. 588, Middle Section Tianfu Avenue, High-Tech Zone, Chengdu, China (Sichuan) Pilot Free Trade Zone
Test specification:	
Standards ..... :	IEC 61730-1:2016 / EN IEC 61730-1:2018 IEC 61730-2:2016 / EN IEC 61730-2:2018
Test procedure ..... :	TÜV NORD Mark
Non-standard test method..... :	N/A

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	Isc [A] /Tolerance	17.55±3%	17.55±3%	20.04±5%	20.31±5%
	Vmp [V]	29.54	29.54	41.84	40.52
	Imp [A]	16.26	16.26	19.05	19.21
aBSI condition	Isc [A] /Tolerance	19.57±3%	19.57±3%	22.56±5%	22.65±5%
Bifaciality coefficient	φPmax /Tolerance	80%±5%	80%±5%	85%±5%	80%±5%
	φVoc /Tolerance	98%±5%	98%±5%	98%±5%	98%±5%
	φIsc /Tolerance	80%±5%	80%±5%	85%±5%	80%±5%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30	30	35	35
	Module type	TWMNF-66HD705	TWMNH-66HD610	TWMND-72HD575	TWMNH-66HD605
STC condition	Pmp [W] /Tolerance	705±3%	610±3%	575±3%	605±3%
	Voc [V] /Tolerance	48.77±5%	48.70±5%	52.10±3%	48.50±5%
	Isc [A] /Tolerance	18.40±5%	15.94±5%	13.80±3%	15.88±5%
	Vmp [V]	40.52	40.48	43.76	40.31
	Imp [A]	17.40	15.07	13.14	15.01
BNPI condition	Pmp [W] /Tolerance	778.4±3%	673.6±3%	645.0±3%	667.9±3%
	Voc [V] /Tolerance	48.77±5%	48.70±5%	52.10±3%	48.50±5%
	Isc [A] /Tolerance	20.31±5%	17.60±5%	15.23±3%	17.53±5%
	Vmp [V]	40.52	40.48	43.76	40.31
	Imp [A]	19.21	16.64	14.51	16.57
aBSI condition	Isc [A] /Tolerance	22.65±5%	19.62±5%	16.99±3%	19.55±5%
Bifaciality coefficient	φPmax /Tolerance	80%±5%	80%±5%	80%±5%	80%±5%
	φVoc /Tolerance	98%±5%	98%±5%	98%±5%	98%±5%
	φIsc /Tolerance	80%±5%	80%±5%	80%±5%	80%±5%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	35	35	30	35

Note:

1. Further qualification for higher and/or lower output power see annex 3 of test report no. 492013017.003 part 1 of 2
2. aBSI corresponding to irradiance corresponding to the combination of 1000W/m^2 on the front side of the

module with 300 W/m^2 irradiance for the rear side of the module		
Product Safety Ratings		
Maximum systems voltage (Vsys) ..... :	1500	V
Maximum over-current protection rating ..... :	30 or 35	A
Class in accordance with IEC 61140..... :	See clause 5.1	
Intended use (list details) ..... :	See clause 5.5	
The modules are intended for a maximum operating altitude [meters above sea level] of..... :	≤ 2000	m
Recommended maximum series/parallel module configurations..... :	refer to installation manual	

General Product Information:

Module type: TWMND-72HD570 (BOM1)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☐ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☐ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☒ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☐ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMND-72HD580 (BOM2)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☐ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☐ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☒ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☐ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMND-72HD585 (BOM3)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☐ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☐ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☒ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☐ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMND-72HD570 (BOM4)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☒ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☐ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☐ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMND-72HD570 (BOM5)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☒ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☐ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☐ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMND-72HD570 (BOM6)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☒ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☒ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☒ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMND-72HD570 (BOM7)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☒ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☒ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☒ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMND-72HD570 (BOM8)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☒ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☒ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☒ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMNH-48HC435 (BOM9)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☐ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☐ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☒ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMNH-48HD435 (BOM10)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☐ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☐ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☒ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMNH-48HD435 (BOM11)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☐ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☐ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☒ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMNH-48HD435 (BOM12)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☐ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☐ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☒ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMNH-48HC435 (BOM13)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☒ 4.2.1 Modification to frontsheet
- ☐ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☒ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☐ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMHF-66HD715 (BOM14)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☒ 4.2.2 Modification to encapsulation system
- ☒ 4.2.3 Modification to cell technology
- ☒ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☒ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☒ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMHF-66HD715 (BOM15)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☐ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☒ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☒ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☒ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMNF-66HD705 (BOM16)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☐ 4.2.2 Modification to encapsulation system
- ☒ 4.2.3 Modification to cell technology
- ☐ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☐ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMND-72HD575 (BOM20)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☒ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☒ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☒ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☐ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMND-72HD575 (BOM21)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☒ 4.2.2 Modification to encapsulation system
- ☐ 4.2.3 Modification to cell technology
- ☒ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☒ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☐ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module type: TWMNH-66HD615 (BOM22)

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. .....: 492012695.015

Model differences and modification:

☒ Test programs for crystalline silicon PV modules

- ☐ 4.2.1 Modification to frontsheet
- ☒ 4.2.2 Modification to encapsulation system
- ☒ 4.2.3 Modification to cell technology
- ☒ 4.2.4 Modification to cell and string interconnect material or technique
- ☐ 4.2.5 Modification to backsheet
- ☐ 4.2.6 Modification to electrical termination
- ☐ 4.2.7 Modification to bypass diode
- ☐ 4.2.8 Modification to electrical circuitry
- ☐ 4.2.9 Modification to edge sealing
- ☐ 4.2.10 Modification to frame and/or mounting structure
- ☐ 4.2.11 Change in PV module size
- ☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
- ☐ 4.2.13 Increase of over-current protection rating
- ☐ 4.2.14 Increase of system voltage
- ☐ 4.2.15 Change in cell fixing tape
- ☐ 4.2.16 Others

☐ Test programs for thin-film PV modules

- ☐ 4.3.1 Modification to frontsheet
- ☐ 4.3.2 Modification to encapsulation system
- ☐ 4.3.3 Modification to front contact (e. g. TCO)
- ☐ 4.3.4 Modification to cell technology
- ☐ 4.3.5 Modification to cell layout
- ☐ 4.3.6 Modification to back contact
- ☐ 4.3.7 Modification to edge deletion
- ☐ 4.3.8 Modification to interconnect material or technique
- ☐ 4.3.9 Modification to backsheet
- ☐ 4.3.10 Modification to electrical termination
- ☐ 4.3.11 Modification to bypass diode
- ☐ 4.3.12 Modification to edge sealing
- ☐ 4.3.13 Modification to frame and/or mounting structure
- ☐ 4.3.14 Change in PV module size
- ☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
- ☐ 4.3.16 Increase of over-current protection rating
- ☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

Module Group Assignment:

6 SAMPLING			
	☐ The modules tested (modules and laminate) were taken at random from a production batch and subjected to manufacturer's normal quality control and inspection for safety testing		N/A
	☒ The modules tested (modules and laminate) were prototypes of a new design and not taken from a production batch.		P
	☒ Preconditioning of test samples was performed within IEC 61215 performance testing		P
	☐ Preconditioning of test samples was performed separately from IEC 61215 performance testing		N/A
Supplementary information: N/A			

Module group assignment:				
Sample #	Sample Group ID	Type/model	Sample S/N	Remark
BOM1				
1-M10	Control	TWMND-72HD570	Y2E241004000393	Control
1-M6	D	TWMND-72HD570	Y2E241004000378	ML
1-M15	Module-Break	TWMND-72HD570	Y2E241004000380	MB
BOM2				
2-M10	Control	TWMND-72HD580	S1E242001000193	Control
2-M6	D	TWMND-72HD580	S1E242001000190	ML
2-M15	Module-Break	TWMND-72HD580	S1E242001000296	MB
BOM3				
3-M10	Control	TWMND-72HD585	Y1E243001000065	Control
3-M6	D	TWMND-72HD585	Y1E243001000063	ML
3-M15	Module-Break	TWMND-72HD585	Y1E243001000086	MB
BOM4				
4-M10	Control	TWMND-72HD570	H5E236003000227	Control
4-M1	A	TWMND-72HD570	H5E236003000184	MC
4-M2-1	B	TWMND-72HD570	H5E236003000165	B sequence, UV exposed on the front side
4-M2-2	B	TWMND-72HD570	H5E236003000104	B sequence, UV exposed on the rear side
4-M3	B1	TWMND-72HD570	H5E236003000179	B1 sequence
4-M4	C	TWMND-72HD570	H5E236003000225	UV15, TC50, HF10, RT
4-M6	D	TWMND-72HD570	H5E236003000484	DH, RT, ML

4-M12	F2	TWMND-72HD570	H5E236003000226	HS
4-M13	F3	TWMND-72HD570	H5E236003000214	TT, RC
4-M14	G	TWMND-72HD570	H5E236003000221	IV
4-M15	Module-Break	TWMND-72HD570	H5E236003000445	MB
4-M16	Ignitibility	TWMND-72HD570	H5E236003000120	Ignitibility
4-fire 1	Fire test	TWMND-72HD570	H5E236003000159	Spread of flame
4-fire 2	Fire test	TWMND-72HD570	H5E236003000500	Spread of flame
4-fire 3	Fire test	TWMND-72HD570	H5E236003000207	Burning brand
BOM5				
5-M1	A	TWMND-72HD570	H5E236003000392	MC
5-M8-1	B	TWMND-72HD570	H5E236003000434	B sequence, UV exposed on the front side
5-M8-2	B	TWMND-72HD570	H5E236003000557	B sequence, UV exposed on the rear side
5-M3	B1	TWMND-72HD570	H5E236003000545	B1 sequence
5-M4	C	TWMND-72HD570	H5E236003000545	UV15, TC50, HF10, RT
5-M6	D	TWMND-72HD570	H5E236003000390	DH, RT, ML
5-M12	F2	TWMND-72HD570	H5E236003000471	HS
5-M13	F3	TWMND-72HD570	H5E236003000157	TT, RC
5-M14	G	TWMND-72HD570	H5E236003000151	IV
5-M15	Module-Break	TWMND-72HD570	H5E236003000396	MB
5-M16	Ignitibility	TWMND-72HD570	H5E236003000025	Ignitibility
5-fire 1	Fire test	TWMND-72HD570	H5E236003000151	Spread of flame
5-fire 2	Fire test	TWMND-72HD570	H5E236003000228	Spread of flame
5-fire 3	Fire test	TWMND-72HD570	H5E236003000230	Burning brand
BOM6				
6-M10	Control	TWMND-72HD570	H5E236003000344	Control
6-M1	A	TWMND-72HD570	H5E236003000342	MC
6-M2-1	B	TWMND-72HD570	H5E236003000059	B sequence, UV exposed on the front side
6-M2-2	B	TWMND-72HD570	H5E236003000427	B sequence, UV exposed on the rear side
6-M3	B1	TWMND-72HD570	H5E236003000143	B1 sequence
6-M4	C	TWMND-72HD570	H5E236003000408	UV15, TC50, HF10, RT

6-M6	D	TWMND-72HD570	H5E236003000382	DH, RT, ML
6-M8	E	TWMND-72HD570	H5E236003000326	TC200
6-M12	F2	TWMND-72HD570	H5E236003000112	HS
6-M14	G	TWMND-72HD570	H5E236003000140	IV
6-M15	Module-Break	TWMND-72HD570	H5E236003000074	MB
6-M16	Ignitibility	TWMND-72HD570	H5E236003000110	Ignitibility
6-fire 1	Fire test	TWMND-72HD570	H5E236003000301	Spread of flame
6-fire 2	Fire test	TWMND-72HD570	H5E236003000333	Spread of flame
6-fire 3	Fire test	TWMND-72HD570	H5E236003000421	Burning brand
BOM7				
7-M10	Control	TWMND-72HD570	H5E236003000010	Control
7-M1	A	TWMND-72HD570	H5E236003000189	MC
7-M2-1	B	TWMND-72HD570	H5E236003000592	B sequence, UV exposed on the front side
7-M2-2	B	TWMND-72HD570	H5E236003000595	B sequence, UV exposed on the rear side
7-M3	B1	TWMND-72HD570	H5E236003000127	B1 sequence
7-M4	C	TWMND-72HD570	H5E236003000303	UV15, TC50, HF10, RT
7-M6	D	TWMND-72HD570	H5E236003000168	DH, RT, ML
7-M8	E	TWMND-72HD570	H5E236003000594	TC200
7-M12	F2	TWMND-72HD570	H5E236003000083	HS
7-M14	G	TWMND-72HD570	H5E236003000021	IV
7-M15	Module-Break	TWMND-72HD570	H5E236003000574	MB
7-M16	Ignitibility	TWMND-72HD570	H5E236003000311	Ignitibility
7-fire 1	Fire test	TWMND-72HD570	H5E236003000588	Spread of flame
7-fire 2	Fire test	TWMND-72HD570	H5E236003000172	Spread of flame
7-fire 3	Fire test	TWMND-72HD570	H5E236003000285	Burning brand
BOM8				
8-M10	Control	TWMND-72HD570	H5E236003000375	Control
8-M1	A	TWMND-72HD570	H5E236003000076	MC
8-M2-1	B	TWMND-72HD570	H5E236003000338	B sequence, UV exposed on the front side
8-M2-2	B	TWMND-72HD570	H5E236003000339	B sequence, UV exposed on the rear side
8-M3	B1	TWMND-72HD570	H5E236003000068	B1 sequence

8-M4	C	TWMND-72HD570	H5E236003000077	UV15, TC50, HF10, RT
8-M6	D	TWMND-72HD570	H5E236003000329	DH, RT, ML
8-M8	E	TWMND-72HD570	H5E236003000411	TC200
8-M12	F2	TWMND-72HD570	H5E236003000368	HS
8-M14	G	TWMND-72HD570	H5E236003000398	IV
8-M15	Module-Break	TWMND-72HD570	H5E236003000108	MB
8-M16	Ignitibility	TWMND-72HD570	H5E236003000374	Ignitibility
8-fire 1	Fire test	TWMND-72HD570	H5E236003000116	Spread of flame
8-fire 2	Fire test	TWMND-72HD570	H5E236003000391	Spread of flame
8-fire 3	Fire test	TWMND-72HD570	H5E236003000381	Burning brand
BOM9				
9-fire 1	Fire test	TWMNH-48HC435	C1M241006000311	Spread of flame
9-fire 2	Fire test	TWMNH-48HC435	C1M241006000289	Spread of flame
9-fire 3	Fire test	TWMNH-48HC435	C1M241006000301	Burning brand
BOM10				
10-fire 1	Fire test	TWMNH-48HD435	YF202312080005S48TW182E2160938	Spread of flame
10-fire 2	Fire test	TWMNH-48HD435	YF202312080005S48TW182E2160942	Spread of flame
10-fire 3	Fire test	TWMNH-48HD435	YF202312080005S48TW182E2160945	Burning brand
BOM11				
11-fire 1	Fire test	TWMNH-48HD435	YF202312080005S48TW182E2160921	Spread of flame
11-fire 2	Fire test	TWMNH-48HD435	YF202312080005S48TW182E2160925	Spread of flame
11-fire 3	Fire test	TWMNH-48HD435	YF202312080005S48TW182E2160928	Burning brand
BOM12				
12-fire 1	Fire test	TWMNH-48HC435	YYF202312080005S48TW182E2160913	Spread of flame
12-fire 2	Fire test	TWMNH-48HC435	YF202312080005S48TW182E2160924	Spread of flame
12-fire 3	Fire test	TWMNH-48HC435	YF202312080005S48TW182E2160916	Burning brand
BOM13				
13-M10	Control	TWMNH-48HC435	YF202401250004S48TW182E216SY2636	Control
13-M1	A	TWMNH-48HC435	YF202401250004S48TW182E216SY2625	MC

13-M4	C	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2629	UV15, TC50, HF10, RT
13-M6	D	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2622	DH, RT, ML
13-M8	E	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2633	TC200
13-M12	F2	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2638	HS
13-M13	F3	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2639	TT, RC
13-M14	G	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2649	IV
13-M15	Module-Break	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2650	MB
13-M16	Ignitibility	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2641	Ignitibility
13-fire 1	Fire test	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2632	Spread of flame
13-fire 2	Fire test	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2635	Spread of flame
13-fire 3	Fire test	TWMNH-48HC435	YF202401250004S48TW182E21 6SY2648	Burning brand
BOM14				
14-M10	Control	TWMHF-66HD715	H1E23C002000148	Control
14-M1	A	TWMHF-66HD715	H1E241001000090	MC
14-M2	B	TWMHF-66HD715	H1E241006000091	B sequence
14-M3	B1	TWMHF-66HD715	H1E241006000095	B1 sequence
14-M4	C	TWMHF-66HD715	H1E241006000092	UV15, TC50, HF10, RT
14-M6	D	TWMHF-66HD715	H1E241004000120	DH, RT, ML
14-M8	E	TWMHF-66HD715	H1E23B005000002	TC200
14-M11	F1	TWMHF-66HD715	H1E241001000088	BDT
14-M12	F2	TWMHF-66HD715	H1E23C002000085	HS
14-M13	F3	TWMHF-66HD715	H1E241004000131	TT, RC
14-M14	G	TWMHF-66HD715	H1E241001000097	IV
14-M15	Module-Break	TWMHF-66HD715	H1E241004000089	MB
14-M16	Ignitibility	TWMHF-66HD715	H1E241004000098	Ignitibility
14-fire 1	Fire test	TWMHF-66HD715	H1E241004000095	Spread of flame
141-fire 2	Fire test	TWMHF-66HD715	H1E241004000096	Spread of flame
14-fire 3	Fire test	TWMHF-66HD715	H1E241004000097	Burning brand
BOM15				

15-M10	Control	TWMHF-66HD715	C1M241003000500	Control
15-M6	D	TWMHF-66HD715	C1M241003000495	DH, ML
15-M8	E	TWMHF-66HD715	C1M241003000493	TC200
15-M12	F2	TWMHF-66HD715	C1M241003000494	HS
15-M13	F3	TWMHF-66HD715	C1M241003000506	TT, RC
15-M14	G	TWMHF-66HD715	C1M241003000512	IV
BOM16				
16-M10	Control	TWMNF-66HS705	C1M241007000087	Control
16-M4	C	TWMNF-66HS705	C1M241007000091	UV, TC50, HF10, RT
16-M6	D	TWMNF-66HS705	C1M241007000184	DH, RT, ML
16-M8	E	TWMNF-66HS705	C1M241007000210	TC200
16-M12	F2	TWMNF-66HS705	C1M241007000093	HS
16-M13	F3	TWMNF-66HS705	C1M241007000090	TT, RC
BOM20				
20-M10	Control	TWMND-72HD575	H5E236003000563	Control
20-M1	A	TWMND-72HD575	H5E236003000573	MC
20-M2	B	TWMND-72HD575	H5E236003000555	B sequence
20-M3	B1	TWMND-72HD575	H5E236003000539	B1 sequence
20-M4	C	TWMND-72HD575	H5E236003000175	UV15, TC50, HF10, RT
20-M6	D	TWMND-72HD575	H5E236003000256	DH, RT, ML
20-M8	E	TWMND-72HD575	H5E236003000055	TC200
20-M12	F2	TWMND-72HD575	H5E236003000294	HS
20-M13	F3	TWMND-72HD575	H5E236003000495	TT, RC
20-M14	G	TWMND-72HD575	H5E236003000544	IV
20-M15	Module-Break	TWMND-72HD575	H5E236003000224	MB
20-M16	Ignitibility	TWMND-72HD575	H5E236003000296	Ignitibility
20-fire 1	Fire test	TWMND-72HD575	H5E236003000280	Spread of flame
20-fire 2	Fire test	TWMND-72HD575	H5E236003000067	Spread of flame
20-fire 3	Fire test	TWMND-72HD575	H5E236003000053	Burning brand
BOM21				
21-M10	Control	TWMND-72HD575	H5E236003000564	Control
21-M1	A	TWMND-72HD575	H5E236003000178	MC
21-M2	B	TWMND-72HD575	H5E236003000565	B sequence
21-M3	B1	TWMND-72HD575	H5E236003000233	B1 sequence

21-M4	C	TWMND-72HD575	H5E236003000180	UV15, TC50, HF10, RT
21-M6	D	TWMND-72HD575	H5E236003000261	DH, ML
21-M8	E	TWMND-72HD575	H5E236003000572	TC200
21-M12	F2	TWMND-72HD575	H5E236003000260	HS
21-M13	F3	TWMND-72HD575	H5E236003000550	TT, RC
21-M14	G	TWMND-72HD575	H5E236003000490	IV
21-M15	Module-Break	TWMND-72HD575	H5E236003000567	MB
21-M16	Ignitability	TWMND-72HD575	H5E236003000262	Ignitability
21-fire 1	Fire test	TWMND-72HD575	H5E236003000541	Spread of flame
21-fire 2	Fire test	TWMND-72HD575	H5E236003000235	Spread of flame
21-fire 3	Fire test	TWMND-72HD575	H5E236003000255	Burning brand
BOM22				
22-M10	Control	TWMNH-66HD615	YF202402220002S66TW210AT2202228	Control
22-M1	A	TWMNH-66HD615	YF202402220002S66TW210AT2202217	MC
22-M2	B	TWMNH-66HD615	YF202402220002S66TW210AT2202221	B sequence
22-M3	B1	TWMNH-66HD615	YF202402220002S66TW210AT2202235	B1 sequence
22-M4	C	TWMNH-66HD615	YF20240201S66TW210AT2200121	UV15, TC50, HF10, RT
22-M6	D	TWMNH-66HD615	YF20240201S66TW210AT2200111	DH, RT, ML
22-M8	E	TWMNH-66HD615	YF20240201S66TW210AT2200119	TC200
22-M11	F1	TWMNH-66HD615	YF202402220002S66TW210AT2202230	BDT
22-M12	F2	TWMNH-66HD615	YF20240201S66TW210AT2200109	HS
22-M13	F3	TWMNH-66HD615	YF202402220002S66TW210AT2202229	TT, RC
22-M14	G	TWMNH-66HD615	YF202402220002S66TW210AT2202237	IV
22-M15	Module-Break	TWMNH-66HD615	YF202402220002S66TW210AT2202219	MB
22-M16	Ignitability	TWMNH-66HD615	YF202402220002S66TW210AT2202201	Ignitability
22-fire 1	Fire test	TWMNH-66HD615	YF202402220002S66TW210AT2202223	Spread of flame

22-fire 2	Fire test	TWMNH-66HD615	YF202402220002S66TW210AT2 202232	Spread of flame
22-fire 3	Fire test	TWMNH-66HD615	YF202402220002S66TW210AT2 202227	Burning brand
Remarks: 1.... Continuity test of equipotential bonding (MST 13) were also performed on samples M18#, M19#, M20# and M21# for each BOM, which are assigned to do Potential Induced Degradation tests (MQT 21). 2.... Additional samples (sample# 2-M14-2, 4-M14-2, 22-M14-2) were send to lab for insulation coordination test, see Table 1.				

Note (1) Use the “General product information” field to give any information on model differences within a product type family covered by the test report and describe the range of electrical and safety ratings, if the TRF covers a type family of modules.

Note (2) Use Annex 2 to list the used materials and components of the module (manufacturer/supplier and type reference)

Note (3) The module numbers/identifiers are set in accordance to IEC 62915 Photovoltaic (PV) modules – Retesting for type approval, design and safety qualification, Annex A3 of IEC 62915

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict

IEC 61730 PART 1: REQUIREMENTS FOR CONSTRUCTION

4 CLASSIFICATION, APPLICATIONS AND INTENDED USE			
4.1 General			
	The module has been evaluated for the following Class (IEC 61140)……:	☐ Class 0 ☒ Class II ☐ Class III	—
4.5 Intended use			
	PV modules are installed in the following special applications:		—
	Building attached PV (BAPV)	☐ yes ☒ no	—
	Building integrated PV (BIPV)	☐ yes ☒ no	—
	Applications in areas where snow and / or wind load exceeding loads as tested in IEC 61730-2 are expected	☐ yes ☒ no	—
	Applications at environmental temperature exceeding the limits indicated in of IEC 61730-1:2016	☐ yes ☒ no	—
	other (please specify)	☐ yes, as follows: ☒ no	—
5 REQUIREMENTS FOR DESIGN AND CONSTRUCTION			
5.1 General			—
	PV module suitable for operation in outdoor non-weather protected locations, exposed to direct and indirect (albedo) solar radiation, in an environmental temperature range of at least –40 ℃ to +40 ℃ and up to 100 % relative humidity as well as rain.	IEC 61215 and IEC 61730-2, all tests were passed.	P
	Product shipped from the factory as	☒ completely assembled ☐ subassemblies	—
	The provided assemblies of the product do not involve any action that is likely to affect compliance with the requirements of the IEC 61730 series.	No assembly part is present.	N/A
	Incorporation of a PV module into the final assembly does not require any alteration of the PV module from its originally evaluated form.	No assembly part is present.	N/A
	Equipotential bonding continuity is not interrupted by installation	IEC 61730-2, MST 13 was passed	P
	Any adjustable or movable structural part are provided with a locking device	No such part	N/A

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	PV modules have no accessible burrs, sharp edges or sharp points	IEC 61730-2, MST06 was passed	P
	The parts of a PV module shall be prevented from loosening or turning	Compliance is verified, junction box have been qualificated according to IEC 62790	P
5.2 Marking and documentation			
5.2.1	Instructions related to safety are in an official language of the country where the equipment is to be installed.	Installation manual with English.and / or Chinese and / or French	P
5.2.2 Marking			
5.2.2.1 General			
	Each PV module includes the following clear and indelible markings:		—
	a) Name, registered trade name, or registered trade mark of manufacturer	Written on the nameplate	P
	b) Type or model number designation	Written on the nameplate.	P
	c) Serial number	Laminated inside near frame	P
	d) Date and place of manufacture; alternatively serial number assuring traceability of date and place of manufacture	Traceable from serial number.	P
	e) Polarity of terminals or leads	Polarized by color / tag / “+/-” imprinted on the body	P
	f) “Maximum system voltage” or ”Vsys”	Written on the nameplate.	P
	g) Class of protection against electrical shock, in accordance with Clause 4 of IEC 61730-1:2016	Written on the nameplate.	P
	h) “Voltage at open-circuit” or “Voc” including manufacturing tolerances	Written on the nameplate.	P
	i) “Current at short-circuit” or “Isc” including manufacturing tolerances	Written on the nameplate.	P
	j) “PV module maximum power” or “Pmax” including manufacturing tolerances	Written on the nameplate.	P
	k) “Maximum overcurrent protection rating”	Written on the nameplate.	P
	All electrical data are shown as relative to standard test conditions (STC) (1 000 W/m^2, (25 ± 2) ℃, AM 1.5 according to IEC 60904-3).	Written on the nameplate.	P
	International symbols are used where applicable.	Compliance is verified by MST 01 visual inspection	P

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	PV connectors or wiring are marked in accordance to IEC 62852 with a symbol „Do not disconnect under load”.	“Do not disconnect under load” is written on the connector.	P
	Symbol or warning notice are imprinted or labelled close to connector	Symbol and warning notice are imprinted connector	P
	PV connectors are clearly marked indicating the terminal polarity.	The terminal polarity is marked on the PV connectors.	P
	For Class II and Class 0 PV modules, the (IEC 60417-6042: Caution, risk of electric shock) symbol is applied near the PV module electrical connection means.	Written on the nameplate.	P
	PV modules are marked to indicate the class	☒ class II: ☐ ☐ class III: III ☐ class 0: no symbol	P
	PV modules provided with a functional earth connection (see section 5.2.2.2.2)	No functional earth connection	N/A
	PV modules with terminals for field wiring rated only for use with copper wire are marked, at or adjacent to the terminals, with the statement "Use copper wire only", "Cu only", or the equivalent.	Not required	N/A
	PV modules with terminals for field wiring rated only for use with a different specific wiring material are marked with a similar statement referring to the rated material.	Not required	N/A
5.2.2.2 Symbols			
5.2.2.2.1 Equipotential bonding			
	Bonding conductor for equipotential bonding is identified with:	☒ ; ☐	P
	No other terminal or location is identified in this manner	Compliance is verified by MST 01 Visual inspection	P
5.2.2.2.2 Functional earthing			
	Field installed functional earthing conductor is identified with the symbol:	No Functional earthing	N/A
5.2.3 Documentation			
	Documentation concerning electrical and mechanical installation provided.	Written in installation manual.	P
	Class (see 5.2.2.1) is stated, including specific limitations required for that Class.	Written in installation manual.	P
	Environmental conditions to which the module has been qualified are stated.		—

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	concerning temperature range, typically -40 ℃ to +40 ℃	Written in installation manual.	P
	concerning wind/snow load including safety factor	Written in installation manual.	P
	Documentation for safe installation, use, and maintenance is available for installers and operators.	Written in installation manual.	P
	The documentation contains the following information:		—
	– Name, registered trade name, or registered trade mark of manufacturer	Written on the nameplate.	P
	– Type or model number designation	Written on the nameplate.	P
	– “Maximum system voltage” or ”Vsys”	Written on the nameplate.	P
	– Class of protection against electrical shock	Written on the nameplate.	P
	– “Voltage at open-circuit” or “Voc” including manufacturing tolerances at STC	Written on the nameplate.	P
	– “Current at short-circuit” or “Isc” including manufacturing tolerances at STC	Written on the nameplate.	P
	– “PV module maximum power” or “Pmax” including manufacturing tolerances at STC	Written on the nameplate.	P
	– “Maximum overcurrent protection rating”	See Table 34	P
	– Recommended maximum series / parallel PV module configurations	Written in installation manual.	P
	– Temperature coefficient for voltage at open-circuit	Written in installation manual.	P
	– Temperature coefficient for maximum power	Written in installation manual.	P
	– Temperature coefficient for short-circuit current	Written in installation manual.	P
	All electrical data shall be shown as relative to standard test conditions (1 000 W/m^2, (25 ± 2) ℃, AM 1.5 according to IEC 60904-3).	Written on the nameplate.	P
	International symbols are used	Written on the nameplate.	P
	The electrical documentation includes a detailed description of the electrical installation wiring, including:		—
	– Minimum cable diameters for PV modules intended for field wiring	Written in installation manual.	P
	– Limitations on wiring methods and wire management that apply to the junction box for the PV module	Written in installation manual.	P
	– Size, type, material, and temperature rating of the conductors	Written in installation manual.	P

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	– Type of terminals for field wiring	Written in installation manual.	P
	– Specific PV connector model / types and manufacturer to which the PV module connectors can be mated	Written in installation manual.	P
	– The bonding method(s), if applicable, is specified including all provided or specified hardware	Written in installation manual.	P
	– The type and ratings of bypass diode to be used (if applicable)	Written in installation manual.	P
	– Limitations to the mounting situation (e.g. slope, mounting means, cooling)	Written in installation manual.	P
	– A statement indicating	☒ fire rating(s) and applied standards ☐ statement regarding resistance to external fire sources not evaluated	P
	– Limitations regarding fire ratings (e.g. installation slope, sub structure or other applicable installation information)	Written in installation manual.	P
	– A statement indicating the minimum mechanical means for securing the PV module	Written in installation manual.	P
	– A statement indicating the maximum altitude	Written in installation manual.	P
	The documentation for roof mounting includes:		—
	– A statement indicating the minimum mechanical means for securing the PV module to the roof	Written in installation manual.	P
	– Specific parameter(s) when the fire rating is dependent on a specific mounting structure are provided e.g. specific spacing, or specific means of attachment to the roof or structure.	Written in installation manual.	P
	A statement concerning artificially concentrated sunlight	Written in installation manual.	P
	Assembly instructions are provided with a product shipped in subassemblies, and are detailed and adequate to the degree required to facilitate complete and safe assembly of the product	Not applicable	N/A

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The installation instructions include relevant parameters specified by manufacturer or the following statement or the equivalent: *"Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the values of ISC and VOC marked on this module should be multiplied by a factor of 1,25 when determining component voltage ratings, conductor current ratings, and size of controls connected to the PV output."*	Written in installation manual.	P
5.3 Electrical components and insulation			
5.3.2 Internal wiring			
	Internal wiring has sufficient current carrying capacity for the relevant application.	See Table 34	P
5.3.3 External wiring and cables			
	External wires and cables fulfil the requirements of	☐ EN 50618 ☒ IEC 62930	P
5.3.4 Connectors			
	External DC connectors fulfil the requirements of IEC 62852.	Connector was certified according to IEC 62852.	P
5.3.5 Junction boxes for PV modules			
	Junction boxes for PV modules fulfil the requirements of IEC 62790.	Junction box was certified according to IEC 62790.	P
5.3.6 Frontsheets and backsheets			
	Frontsheet:		—
	Material Frontsheet:	☒ Glass ☐ Polymeric material ☐ Others.	—
	Polymeric frontsheets meet relevant requirements of section 5.5.2	Front sheet is glass, not applicable.	N/A
	Polymeric frontsheets used as relied upon insulation fulfil requirements of		—
	-5.6.4.3 for insulation in thin layers	Front sheet is glass, not applicable.	N/A
	-5.5.2.3 for electrical insulation	Front sheet is glass, not applicable.	N/A
	Thermal index frontsheet (see also 5.5.2.3.3):	☐ TI : ☐ RTE : ☐ RTI : ☒front sheet is glass, not applicable	—

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Adhesion to encapsulant or glass is appropriate	Compliance is checked by test sequences of IEC 61730-2 listed in this report.	P
	Backsheet:		—
	Material Backsheet:	☒ Glass ☐ Polymeric material ☐ Others.	—
	Polymeric backsheets meet relevant requirements of section 5.5.2	See 5.5.2	P
	Polymeric backsheets used as relied upon insulation fulfil requirements of		—
	-5.6.4.3 for insulation in thin layers	See 5.6.4.3	P
	-5.5.2.3 for electrical insulation	See 5.5.2.3	P
	Thermal index backsheet (see also 5.5.2.3.3):	☐ TI : ☐ RTE : ☐ RTI : ☒Backtsheet is glass, not applicable.	—
	Adhesion to encapsulant or glass is appropriate	Compliance is checked by test sequences of IEC 61730-2 listed in this report.	P
5.3.7 Insulation barriers			
	Polymeric insulation barrier meets the relevant requirements of 5.5.2	See 5.5.2	N/A
	Barrier held in place while keeping its required electrical and mechanical properties	No insulation barrier	N/A
	Removal of barrier only possible by using a tool	No insulation barrier	N/A
5.3.8 Electrical connections			
5.3.8.1 General			
	Terminations are so designed, that the contact pressure is not transmitted through insulating material except ceramic, mica or other adequate material. Compliance checked by MST 01	Compliance is checked by MST 01	P
	Measures are taken to prevent connections becoming loose, e.g. by using a washer.	See Table 11 and Table 48	P
	End of a stranded conductor is not consolidated by soft soldering.	Relevant test of IEC 61730-2 was passed	P
	Measures are taken to prevent contact stress impairing electrical conductivity.	Relevant test of IEC 61730-2 was passed	P
5.3.8.2 Terminals for external cables and PV connector ribbons			

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Terminals for electrical connections are suitable for the type and range of conductor cross-sectional areas and meet the relevant requirements of IEC 62790.	Junction box set is certified according to IEC 62790.	P
	Insulated terminals are designed such that a reduction of clearances and creepage distances by displacement is prevented.	Junction box set is certified according to IEC 62790.	P
5.3.8.3 Splices and connections inside a PV module			
	Splices and connections are mechanically secured and provide electrical continuity.	Relevant test of IEC 61730-2 was passed	P
	Electrical connections are soldered, welded, conductively adhered, crimped, or otherwise securely connected.	Electrical connections are soldered	P
	A soldered or conductively adhered joint is additionally mechanically secured.	A soldered is additionally mechanically secured by encapsulation	P
5.3.9 Encapsulants			
	Thermal properties are sufficient for intended application.	Relevant test of IEC 61730-2 was passed.	P
	The insulation properties according to 5.5.2.3 are met, if applicable.	See 5.5.2.3.2	P
5.3.10 Bypass diodes			
	Bypass diodes are rated to withstand the current and voltage for their intended use.	See Table 31 and Table 46	P
5.4 Mechanical and electromechanical connections			
5.4.1 General			
	Type of connection:	☒ Connection within frame ☒ Mounting interfaces via adhesive ☒ frame to clamp a mounting system ☒ Equipotential bonding ☒ Attachment of junction box ☒ mechanical connections within the laminate:	P
	Mechanical connections are durable to withstand the thermal, mechanical, and environmental stresses occurring in the application.	See Table 38, Table 13 and Table 11	P
	Removable parts are only detachable with the aid of tools.		P
	Lids attached without screws have one or several detectable facilities for enabling tools.		P

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	No contact of tools with the live parts when the lid is removed.		P
	No friction between surfaces as the sole means to inhibit the turning or loosening of a part, unless provisions to prevent unintended movement or rotation of the component is given.	No friction between surfaces on tis own	P
5.4.2 Screw connections			
	Screws and mechanical connections withstand the mechanical stresses occurring in normal use.	No screw is used. Mechanical connections can withstand the mechanical stresses, compliance is verified by successfully past relevant tests in IEC 61730-2	P
	Screws are not made of a material which is soft or liable to creep.	No screw is used.	N/A
	Screws used to provide mechanical stability and continuity for equipotential bonding withstand the mechanical stresses occurring in normal use.	No screw is used.	N/A
	At least one screw per electrical- mechanical connection ensures the electrical connection between the metallic components	No screw is used.	N/A
	Screws used for mechanical and electrical connections with a nominal diameter of less than 3 mm are screwed into metal.	No screw is used.	N/A
	For screws used for mechanical and electrical connections two full threads are engaged into the metal.	No screw is used.	N/A
	Screwed and other fixed connections are in such a way that they do not come loose through torsion, bending stresses, vibration, etc.	No screw is used. Other fixed connections can prevent from loose from torsion, etc.	P
5.4.3 Rivets			
	Rivets which serve as electrical as well as mechanical connections are locked against loosening.	No rivets is used.	N/A
5.4.4 Thread-cutting screws			
	Thread-cutting and self-tapping screws are not used for interconnection of current-carrying parts made of a material which is soft or liable to creep.	No screw is used.	N/A
	No thread-forming or thread-cutting (self-tapping) screws (sheet metal screws) are used for the connection of current-carrying parts.	No screw is used.	N/A
	Thread-cutting (self-tapping) screws not be used if they are likely to be operated by the user or installer.	No screw is used.	N/A

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Thread-cutting and thread-forming screws, used to provide continuity for equipotential bonding, are such that it is not necessary to disturb the connection in normal use.	No screw is used.	N/A
	For equipotential bonding one screw is permitted if two full threads engage the metal	No screw is used.	N/A
5.4.5 Form/press / tight fit			
	Form/press/tight fits of metallic components which are not separately equipotentially bonded are electrically connected.	See Table 11	P
	Requirements of MST 32 and MST 34 are met, continuity of equipotential bonding (MST 13) is provided before and after the MST 32 and MST 34 tests	See Table 38, Table 39 and Table 11	P
5.4.6 Connections by adhesives			
	Connections by adhesive for mounting means are sufficient.	See Table 38, Table 39 and Table 11	P
	Fixing of junction box by adhesive is sufficient.	See Table 27, and Table 10	P
	Adhesion of a polymer relied upon for insulation to another insulating layer is appropriate for the application.	Relevant test of IEC 61730-2 was passed	P
	Requirements for adhesive materials are met	See 5.5.4	P
	Connection by adhesive which is considered as cemented joint fulfils the requirements of 5.6.4.2.	no cemented joints, not applicable	N/A
5.4.7 Other connections			
	Other connections such as, welded or soldered, as well as Materials and processes for creating the connections are appropriate for the application and for the intended use.	See Table 6 and Table 43	P
	Other connections which are relied upon for equipotential bonding fulfil the requirements of (MST 13).	See Table 11	P
5.5 Materials			
5.5.2 Polymeric materials			
5.5.2.1 General			
	Polymeric materials are able to durably and safely withstand the electrical, mechanical, thermal, environmental, and corrosive stresses occurring in the application.	Relevant test of IEC 61730-2 was passed	P
	Polymeric materials are resistant to electrical and mechanical property degradation.	Test results see subsequent sections	P

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Polymeric parts which ensure either the electrical or mechanical safety of the PV module, or both, are resistant to electrical and mechanical property degradation.	Test results see subsequent sections	P
	They comply with the requirements of the materials creep test (MST 37) depending on their constructive function in the PV module.	See Table 13	P
	Polymeric material used as a part of a cemented joint fulfils additionally the requirements of 5.6.4.2.	no cemented joint, not applicable	N/A
5.5.2.2 Endurance to weathering stress			
	Polymeric materials of the module and its components are durable to weathering stress.	Test results see subsequent sections	P
5.5.2.3 Polymeric materials used as electrical insulation			
5.5.2.3.1 General			
	Material relied upon for insulation are of adequate thickness, as described in Tables 3 and 4.	See Table 49 and Annex 1	P
	The temperature limits of materials used as insulation are not less than the maximum measured operating temperature of the specific material in application, as measured during the temperature test (MST 21).	See Table 32	P
5.5.2.3.2 Endurance to electrical stress			
	Materials used as electrical insulation are in compliance with the insulation coordination requirements	See 5.6.3	P
5.5.2.3.3 Endurance to thermal stress			
	Materials used as relied upon insulation have a mechanical and electrical relative thermal endurance, relative thermal index or temperature index (RTE/RTI or TI) appropriate for the application, at least 90 ℃.	☒ TI : 110 ℃ ☐ RTE : ☐ RTI : See Table 32	P
5.5.2.3.4 Polymeric insulating materials used as external parts			
	External polymeric parts of the PV module meet the following requirements:		—
	-flammability class minimum V-1	5VB for junction box body V-1 for connector body V-1 for cable insulation material	P
	-ball pressure test with a temperature of 75 ℃	Junction box set is certificated according to IEC 62790	P
	-ignitability test in final application	See Table 37	P
	-peel test of cemented joints	Not applicable.	N/A
	-lap shear strength test	Not applicable.	N/A
5.5.2.3.5 Polymeric insulating parts supporting live parts			

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	External parts of insulating material supporting live parts including connections, and parts of polymeric material providing supplementary insulation or reinforced insulation, are sufficiently resistant to heat.	Junction box meet the IEC 62790 requirements Connectors meet the IEC 62852 requirements Cable meet the IEC 62930 requirements	P
	Polymeric parts which are not components of the laminate fulfil the requirements of ignitability test	Junction box meet the IEC 62790 requirements Connectors meet the IEC 62852 requirements Cable meet the IEC 62930 requirements	P
	Other than elastomeric polymeric materials meet the following requirements:		—
	-flammability class minimum HB	Junction box meet the IEC 62790 requirements Connector meet the IEC 62852 requirements	P
	-ball pressure test with a temperature of 125 ℃	Junction box meet the IEC 62790 requirements Connector meet the IEC 62852 requirements	P
	-material creep test	Junction box meet the IEC 62790 requirements	P
5.5.2.4 Polymeric materials used for mechanical functions			
	Materials used for mechanical functions have a mechanical relative thermal endurance, relative thermal index or temperature index (RTE/RTI or TI) appropriate for the application, at least 90 ℃.	☐ TI : ☐ RTE : ☐ RTI : See Table 32	P
5.5.3 Metallic materials			
5.5.3.1 General			
	Metal parts are not in contact to metal parts having a difference of their electrochemical potentials of more than 600 mV.	Yes	P
	Iron or mild steel are plated, painted, or enamelled for protection against corrosion.	no such part	N/A
	Corrosion protection is at least equivalent to a zinc coating of 0.015 mm thickness	no Iron or mild steel used	N/A
5.5.3.2 Current carrying parts			
	Assessed parts:	Internal wire, String connector and busbar connector	—

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Current-carrying parts have sufficient mechanical strength and electrical conductivity.	See Table 32 See Table 34 See Table 11	P
	Current-carrying materials are protected against corrosion.	Relevant tests of IEC 61730-2 were passed.	P
	The coating for protective coated metal is capable of preventing corrosion according to either one of the listed standards.	☐ ISO 1456 ☐ ISO 1461 ☐ ISO 2081 ☒ ISO 2093	P
	Coated metal not used if the current-carrying parts are stressed by abrasion.	yes, compliance is verified by MST 01 visual inspection	P
5.5.4 Adhesives			
	Adhesives are appropriate for the application.	See Tables 40, Table 39, Table 27, Table 29, Table 12, and Table 10	P
	Adhesive as part of the relied upon electrical insulation meets the requirements of 5.5.2.3.3	no adhesive used as part of the relied upon electrical insulation	N/A
5.6 Protection against electric shock			
5.6.1 General			
	Adequate protection against contact with hazardous live parts provided	Relevant tests of IEC 61730-2 were passed.	P
	Specimen pose no risk of electric shock.	Relevant tests of IEC 61730-2 were passed.	P
5.6.2 Protection against accessibility to hazardous live parts			
5.6.2.1 General			
	Class of module	II	—
	For class 0 and Class II modules adequate protection against accessibility to hazardous live parts (> 35 V DC) provided.	See Table 12	P
Table 2 of 5.6.2.3	For Class 0 PV modules, accessible metal parts and accessible surfaces as well as live parts of different potential of the same circuit are separated by at least basic insulation.	Not applicable.	N/A
	For Class II PV modules construction provide separation between accessible parts or accessible surfaces and hazardous live parts by double or reinforced insulation.	Class II, compliance is checked by visual inspection (MST 01) and by accessibility test (MST 11).	P
Table 2 of 5.6.2.3	For Class II PV modules, live parts of different potential of the same circuit are separated by double or reinforced insulation.	Class II PV modules, live parts of different potential of the same circuit are separated by double insulation.	P

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	For Class III PV modules separation between accessible parts or accessible surfaces and hazardous live parts by functional insulation.	Not applicable.	N/A
Table 2 of 5.6.2.3	In Class III PV modules live parts of different polarity are separated by at least functional insulation.	Not applicable.	N/A
	Materials used for realizing protection against accessibility of hazardous live parts by means of enclosure, insulation barrier or relied upon insulation comply with the requirements of 5.5.2 due to their application.	Relevant tests of IEC 61730-2 were passed.	P
5.6.2.2 Protection by means of enclosures and insulation barriers			
	Enclosures or insulation barriers are so designed that, after mounting, the live parts are not accessible (even after possible deformation)	Relevant tests of IEC 61730-2 were passed.	P
	Degree of protection of the housing is not impaired by any possible deformation.	Relevant tests of IEC 61730-2 were passed.	P
	Parts of enclosures and insulation barriers that provide protection are not removable without the use of a tool.	YES	P
	Lids which are attached without screws have one or several detectable features, e.g. recesses,	Compliance is verified by MST 01 visual inspection	P
	Tool to open the lid do not come into contact with the live parts if lid is removed correctly.	yes	P
	Insulation barrier are held in place and are not affected by influences expected during normal operation. Electrical and mechanical properties don't fall below the minimum acceptable values for the application.	no insulation barrier	N/A
	Parts are prevented from loosening or turning.	Relevant tests of IEC 61730-2 were passed.	P
5.6.2.3 Protection by means of insulation of live parts			
	Insulation materials providing the sole insulation between a live part and an accessible metal part, or between uninsulated live parts not of the same potential, are of adequate thickness and of a material appropriate for the application.	Relevant tests of IEC 61730-2 were passed.	P
	Requirements of Table 2	see 5.6.2.1 of this report	—

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.6.3 Insulation coordination			
5.6.3.1	Components comply with the requirements for their relevant standards	Junction box meet the IEC 62790 requirements Connectors meet the IEC 62852 requirements Cable meet the IEC 62930 requirements	P
5.6.3.2	Pollution degree	I	—
5.6.3.3	Material group	I	—
5.6.3.4	Clearance and creepage distance	Minimum design clearance distance:12.0 Minimum design creepage distance:12.0	P
	Derating factor for altitude above 2000 m is considered	No	N/A
5.6.4 Distance through insulation (dti)			
5.6.4.1 General			
	Polymeric materials for cemented insulation parts and insulation in thin layers shall withstand environmental, thermal, electrical and mechanical stresses as far as they occur.	See 5.5.2	P
	Distances through insulation (dti) of solid insulation comply with the minimum distance as required:	MST04 was passed	P
	System voltage…… ..... :	1500V	—
	Distance through insulation req./meas. (mm):	Double glass: N/A	N/A
	The insulation fulfils the material classification as given in IEC 60216-1, IEC 60216-2 and IEC 60216-5 (RTE/TI/RTI).	☐ TI : ☐ RTE : ☐ RTI : Double glass, not applicable	N/A
5.6.4.2 Cemented joints			
	Cemented joints were considered as	☐ Edge seal ☐ Interface between Junction Box and mounting surface ☐ others No such part	N/A
	Distances along cemented joints comply with the minimum distances as required in table 3 or table 4:	No such part	N/A
	System voltage…….:	See safety ratings	N/A
	Distance along cemented joints req./meas. (mm):	N/A	N/A

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	A distance can be considered as cemented joint if following requirements are met:	N/A	—
	-Neither cracks nor voids in the insulating compounds have been occurred which either by themselves or in combination reduces the distances through the cemented joint below the required values.	N/A	N/A
	-No breakdown at MST 16 (initial and final test)with a 1,35 times higher tests voltage:	N/A	N/A
	Test voltage (V):	N/A	—
	No breakdown at MST 17 (initial and final test)with a 1,35 times higher tests voltage:	N/A	N/A
	Test voltage (V):	N/A	—
	The electrically insulating adhesive/sealant have a volume resistivity:	N/A	—
	-of greater than 50 × 10^6 Ω cm (dry)	N/A	N/A
	-and greater than 10 × 10^6 Ω cm (wet).	N/A	N/A
	☐ rigid / rigid: lap shear test MST 36 ☐ rigid / flexible: Peel test MST 35	N/A	N/A
	Supplement information: Above mentioned tests have to be performed for each cemented joint. Also the materials and their properties have to be listed in annex 2		
5.6.4.3	**Insulation in thin layers**		—
	Relied upon insulation in thin layers is applied at	☐ Backsheet ☐ Front sheet ☐ insulation within laminate ☒ others Double glass, not applicable	—
	Initial Construction of Insulation in thin layers complies with requirements concerning thickness under consideration of figure 4 as described in table 3 or 4	See table 2, 3 and 4	P
	Construction of Insulation in thin layers complies with requirements concerning RTE/TI/RTI	See 5.6.4.1	P
	Insulation in thin layers provide sufficient dielectric strength:		P
	Test voltage for single-layer sheet and for entire multi-layer sheet providing relied upon insulation (2000V + 4 times system voltage)…….:	8000V	P
	Test voltage for each layer of a multi-layer providing relied upon insulation (1000V + 2 times system voltage)…….:	4000V	P

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Informative parameter evaluated according to IEC 62788-2 are presented		P
	Single-layer sheet as well as entire multi-layer sheet in final application comply with following:	—	—
	- Minimum thickness according to lines 1b) of Table 3 and Table 4, (not less than 30µm) req./meas. (mm),:	See Table 49	P
	- Dielectric strength for basic insulation is provided after cut susceptibility test (MST 12) (1000V + 2 times system voltage)	4000V	P
	Test voltage (V):	8000	—

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.6.3.4: Clearance and creepage distances

Table 1: Design evaluation

Clearance (cl) and creepage distance (cr) at/of/between:	Line of table 3or 4	Type of insulation	Pollution degree	☐ I ☐ II ☐ IIIa	Working voltage	Clearance cl (mm)		Creepage cr (mm)	
						Required	Design[a]	Required	Design[a]
Position 1: Internal live parts and outer accessible surfaces	1a	☐ Functional ☐ Basic ☐ Suppl. ☒ Reinforced	☒ 1 ☐ 2 ☐ 3	☐ I ☐ II ☐ IIIa	1500VDC	10.4	12.0	10.4	12.0
Position 2: Thickness of thin layers	1b	☐ Functional ☐ Basic ☐ Suppl. ☒ Reinforced	☐ 1 ☐ 2 ☐ 3	☐ I ☐ II ☐ IIIa	1500VDC	0.3	N/A	0.3	N/A
Position 3: Live parts of different potential inside a PV module	2	☒ Functional ☐ Basic ☐ Suppl. ☐ Reinforced	☒ 1 ☐ 2 ☐ 3	☐ I ☐ II ☐ IIIa	<35VDC	0.1	2.1	0.2	2.1
Position 4: Terminals of different polarity of rewireable junction boxes	3	☐ Functional ☐ Basic ☐ Suppl. ☒ Reinforced	☒ 1 ☐ 2 ☐ 3	☐ I ☐ II ☐ IIIa	<35VDC	0.5	10.4	0.4	10.4
Position 5: Cemented joint	4	☐ Functional ☐ Basic ☐ Suppl. ☒ Reinforced	☐ 1 ☐ 2 ☐ 3	☐ I ☐ II ☐ IIIa	n/a	n/a	n/a	n/a	n/a

Supplementary information:

See photographs/drawings/illustrations on annex 1

Junction box is potted and fulfils the requirements of IEC 62790

Pollution degree I is verified, CTI material group dose not influence the requirement of creepage distcante.

[a] List relevant position and test voltage for each clearence which is verified by impulse voltage test according to IEC 60664-1: Impluse voltage test (16kV) is conducted on sample #4-M14, 5-M14, 6-M14, 7-M14, 8-M14, 13-M14, 14-M14, 15-M14, 20-M14, 21-M14, 22-M14

IEC 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.6.3.4: Clearance and creepage distances

Table 2: PV module evaluation MST 01 initial

Sample #: 4-M14, 5-M14, 6-M14, 7-M14, 8-M14, 13-M14, 14-M14, 15-M14, 20-M14, 21-M14, 22-M14

Clearance (cl) and creepage distance (cr) at/of/between:	Line of table 3or 4	Type of insulation	Pollution degree	CTI Material group	Working voltage	Clearance cl (mm)		Creepage cr (mm)	
						Required	Meas.[a] / sample #	Required	Meas.[a] / sample #
Position 1: Internal live parts and outer accessible surfaces	1a	☐ Functional ☐ Basic ☐ Suppl. ☒ Reinforced	☒ 1 ☐ 2 ☐ 3	☒ I ☐ II ☐ IIIa	1500VDC	10.4	12.0	10.4	12.0
Position 2: Thickness of thin layers	1b	☐ Functional ☐ Basic ☐ Suppl. ☒ Reinforced	☒ 1 ☐ 2 ☐ 3	☒ I ☐ II ☐ IIIa	1500VDC	0.3	n/a	0.3	n/a
Position 3: Live parts of different potential inside a PV module	2	☒ Functional ☐ Basic ☐ Suppl. ☐ Reinforced	☐ 1 ☐ 2 ☐ 3	☐ I ☐ II ☐ IIIa	<35VDC	n/a	n/a	n/a	n/a
Position 4: Terminals of different polarity of rewireable junction boxes	3	☐ Functional ☐ Basic ☐ Suppl. ☒ Reinforced	☐ 1 ☐ 2 ☐ 3	☐ I ☐ II ☐ IIIa	<35VDC	0.5	10.4	0.4	10.4
Position 5: Cemented joint	4	☐ Functional ☐ Basic ☐ Suppl. ☒ Reinforced	☐ 1 ☐ 2 ☐ 3	☐ I ☐ II ☐ IIIa	n/a	n/a	n/a	n/a	n/a

Supplementary information:

See photographs/drawings/illustrations on annex 1

Junction box is potted and fulfils the requirements of IEC 62790

Pollution degree I is verified, CTI material group dose not influence the requirement of creepage distcante.

[a] Report the smallest measured distance and sample #.

List relevant position and test voltage for each clearence which is verified by impulse voltage test according to IEC 60664-1, Impulse voltage test (16kV) is conducted on sample# 4-M14, 5-M14, 6-M14, 7-M14, 8-M14, 13-M14, 14-M14, 15-M14, 20-M14, 21-M14, 22-M14

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

IEC 61730 PART 2: REQUIREMENTS FOR TESTING

8 Testing
Test sequences see IEC 61730-2 Deviations from test sequence are possible but must be documented. See also table 3.

Test Procedures

Module type: TWMND-72HD570 (BOM1)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	N/A
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	N/A
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	N/A
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	N/A
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	N/A

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	N/A
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	N/A
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	N/A
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	N/A
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	N/A
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	N/A
10.15	MST 21 – Temperature Test.....:	See appended Table 32	N/A
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	N/A
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	N/A
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	N/A
10.18	MST 24 – Ignitability test .....:	See appended Table 37	N/A
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	1-M6	1-M10	1-M15												
Control module		X													
MST 01 – Visual inspection	X	X	X												
MST 02 – Performance at STC		X													
MST 03 – Maximum power determination	X														
MST 04 – Insulation thickness test															
MST 05 – Durability of markings	X	X													
MST 06 – Sharp edge test	X	X													
MST 07 – Bypass diode functionality test	X	X													
MST 11 – Accessibility test	X														
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X		X												
MST 14 – Impulse voltage test															
MST 16 – Insulation test	X														
MST 17 – Wet leakage current test	X														
MST 21 – Temperature test															
MST 22 – Hot-spot endurance Test															
MST 23 – Fire Test															
MST 24 – Ignitability test															
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test															
MST 32 – Module breakage test			X												
MST 33 – Screw connections test															
MST 34 – Static mechanical load test	X														
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:															
MST 42 – Robustness of terminations test															
MST 51 – Thermal cycling test 50															
MST 51 - Thermal cycling test 200															
MST 52 – Humidity freeze test															
MST 53 – Damp heat test 200 h															
MST 53 – Damp heat test 1000 h	X														
MST 54 – UV test 15 KWh/m²															
MST 54 – UV test 60 KWh/m²															
MST 55 – Cold conditioning															
MST 56 – Dry heat conditioning															
Legend: X Test performed,															

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

Module type: TWMND-72HD580 (BOM2)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	N/A
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	N/A
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	N/A
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	N/A
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	N/A
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	N/A
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	N/A
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	N/A

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	N/A
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	N/A
10.15	MST 21 – Temperature Test.....:	See appended Table 32	N/A
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	N/A
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	N/A
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	N/A
10.18	MST 24 – Ignitability test .....:	See appended Table 37	N/A
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	2-M6	2-M10	2-M15												
Control module		X													
MST 01 – Visual inspection	X	X	X												
MST 02 – Performance at STC		X													
MST 03 – Maximum power determination	X														
MST 04 – Insulation thickness test															
MST 05 – Durability of markings	X	X													
MST 06 – Sharp edge test	X	X													
MST 07 – Bypass diode functionality test	X	X													
MST 11 – Accessibility test	X														
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X		X												
MST 14 – Impulse voltage test															
MST 16 – Insulation test	X														
MST 17 – Wet leakage current test	X														
MST 21 – Temperature test															
MST 22 – Hot-spot endurance Test															
MST 23 – Fire Test															
MST 24 – Ignitability test															
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test															
MST 32 – Module breakage test			X												
MST 33 – Screw connections test															
MST 34 – Static mechanical load test	X														
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:															
MST 42 – Robustness of terminations test															
MST 51 – Thermal cycling test 50															
MST 51 - Thermal cycling test 200															
MST 52 – Humidity freeze test															
MST 53 – Damp heat test 200 h															
MST 53 – Damp heat test 1000 h	X														
MST 54 – UV test 15 KWh/m²															
MST 54 – UV test 60 KWh/m²															
MST 55 – Cold conditioning															
MST 56 – Dry heat conditioning															
Legend: X Test performed,															

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

Module type: TWMND-72HD585 (BOM3)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	N/A
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	N/A
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	N/A
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	N/A
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	N/A
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	N/A
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	N/A
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	N/A

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	N/A
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	N/A
10.15	MST 21 – Temperature Test.....:	See appended Table 32	N/A
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	N/A
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	N/A
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	N/A
10.18	MST 24 – Ignitability test .....:	See appended Table 37	N/A
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	3-M6	3-M10	3-M15												
Control module		X													
MST 01 – Visual inspection	X	X	X												
MST 02 – Performance at STC		X													
MST 03 – Maximum power determination	X														
MST 04 – Insulation thickness test															
MST 05 – Durability of markings	X	X													
MST 06 – Sharp edge test	X	X													
MST 07 – Bypass diode functionality test	X	X													
MST 11 – Accessibility test	X														
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X		X												
MST 14 – Impulse voltage test															
MST 16 – Insulation test	X														
MST 17 – Wet leakage current test	X														
MST 21 – Temperature test															
MST 22 – Hot-spot endurance Test															
MST 23 – Fire Test															
MST 24 – Ignitability test															
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test															
MST 32 – Module breakage test			X												
MST 33 – Screw connections test															
MST 34 – Static mechanical load test	X														
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:															
MST 42 – Robustness of terminations test															
MST 51 – Thermal cycling test 50															
MST 51 - Thermal cycling test 200															
MST 52 – Humidity freeze test															
MST 53 – Damp heat test 200 h															
MST 53 – Damp heat test 1000 h	X														
MST 54 – UV test 15 KWh/m²															
MST 54 – UV test 60 KWh/m²															
MST 55 – Cold conditioning															
MST 56 – Dry heat conditioning															
Legend: X Test performed,															

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

Module type: TWMND-72HD570 (BOM4)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	P
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	P
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	P
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	P
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	P
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	P
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	P
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	4-M1	4-M2-1	4-M2-2	4-M3	4-M4	4-M6	4-M10	4-M12	4-M13	4-M14	4-M15	4-M16	4-fire1, 2, 3		
Control module							X								
MST 01 – Visual inspection	X	X	X	X	X	X	X	X	X	X	X	X	X		
MST 02 – Performance at STC							X								
MST 03 – Maximum power determination	X	X	X	X	X	X		X	X	X					
MST 04 – Insulation thickness test															
MST 05 – Durability of markings		X	X	X	X	X	X	X	X						
MST 06 – Sharp edge test		X	X	X	X	X	X	X	X						
MST 07 – Bypass diode functionality test		X	X	X	X	X	X	X	X						
MST 11 – Accessibility test	X	X	X	X	X	X									
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X	X	X	X	X					X				
MST 14 – Impulse voltage test										X					
MST 16 – Insulation test	X	X	X	X	X	X		X	X	X					
MST 17 – Wet leakage current test	X	X	X	X	X	X		X	X						
MST 21 – Temperature test									X						
MST 22 – Hot-spot endurance Test								X							
MST 23 – Fire Test													X		
MST 24 – Ignitability test												X			
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test									X						
MST 32 – Module breakage test											X				
MST 33 – Screw connections test															
MST 34 – Static mechanical load test						X									
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:	X														
MST 42 – Robustness of terminations test					X										
MST 51 – Thermal cycling test 50					X										
MST 51 - Thermal cycling test 200															
MST 52 – Humidity freeze test		X	X	X	X										
MST 53 – Damp heat test 200 h		X	X												
MST 53 – Damp heat test 1000 h						X									
MST 54 – UV test 15 KWh/m²					X										
MST 54 – UV test 60 KWh/m²		X	X												
MST 55 – Cold conditioning				X											
MST 56 – Dry heat conditioning				X											
Legend: X Test performed,															

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

Module type: TWMND-72HD570 (BOM5)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	P
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	P
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	P
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	P
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	P
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	P
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	P
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	5-M1	5-M2-1	5-M2-2	5-M3	5-M4	5-M6	5-M10	5-M12	5-M13	5-M14	5-M15	5-M16	5-fire1, 2, 3		
Control module							X								
MST 01 – Visual inspection	X	X	X	X	X	X	X	X	X	X	X	X	X		
MST 02 – Performance at STC							X								
MST 03 – Maximum power determination	X	X	X	X	X	X		X	X	X					
MST 04 – Insulation thickness test		X	X												
MST 05 – Durability of markings		X	X	X	X	X	X	X	X						
MST 06 – Sharp edge test		X	X	X	X	X	X	X	X						
MST 07 – Bypass diode functionality test		X	X	X	X	X	X	X	X						
MST 11 – Accessibility test	X	X	X	X	X	X									
MST 12 – Cut susceptibility test		X	X	X	X	X									
MST 13 – Continuity test of equipotential bonding	X	X	X	X	X	X					X				
MST 14 – Impulse voltage test										X					
MST 16 – Insulation test	X	X	X	X	X	X		X	X	X					
MST 17 – Wet leakage current test	X	X	X	X	X	X		X	X						
MST 21 – Temperature test									X						
MST 22 – Hot-spot endurance Test								X							
MST 23 – Fire Test													X		
MST 24 – Ignitability test												X			
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test									X						
MST 32 – Module breakage test											X				
MST 33 – Screw connections test															
MST 34 – Static mechanical load test						X									
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:	X														
MST 42 – Robustness of terminations test					X										
MST 51 – Thermal cycling test 50					X										
MST 51 - Thermal cycling test 200															
MST 52 – Humidity freeze test		X	X	X	X										
MST 53 – Damp heat test 200 h		X	X												
MST 53 – Damp heat test 1000 h						X									
MST 54 – UV test 15 KWh/m²					X										
MST 54 – UV test 60 KWh/m²		X	X												
MST 55 – Cold conditioning				X											
MST 56 – Dry heat conditioning				X											
Legend: X Test performed,															

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

Module type: TWMND-72HD570 (BOM6)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	P
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	P
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	P
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	P
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	P
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	P
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	N/A
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	N/A
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	6-M1	6-M2-1	6-M2-2	6-M3	6-M4	6-M6	6-M8	6-M10	6-M12	6-M14	6-M15	6-M16	6-fire1, 2, 3		
Control module								X							
MST 01 – Visual inspection	X	X	X	X	X	X	X	X	X	X	X	X	X		
MST 02 – Performance at STC								X							
MST 03 – Maximum power determination	X	X	X	X	X	X	X		X	X					
MST 04 – Insulation thickness test															
MST 05 – Durability of markings		X	X	X	X	X	X	X	X						
MST 06 – Sharp edge test		X	X	X	X	X	X	X	X						
MST 07 – Bypass diode functionality test		X	X	X	X	X	X	X	X						
MST 11 – Accessibility test	X	X	X	X	X	X	X								
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X	X	X	X	X	X				X				
MST 14 – Impulse voltage test										X					
MST 16 – Insulation test	X	X	X	X	X	X	X		X	X					
MST 17 – Wet leakage current test	X	X	X	X	X	X	X		X						
MST 21 – Temperature test															
MST 22 – Hot-spot endurance Test									X						
MST 23 – Fire Test													X		
MST 24 – Ignitability test												X			
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test															
MST 32 – Module breakage test											X				
MST 33 – Screw connections test															
MST 34 – Static mechanical load test						X									
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:	X														
MST 42 – Robustness of terminations test					X										
MST 51 – Thermal cycling test 50					X										
MST 51 - Thermal cycling test 200							X								
MST 52 – Humidity freeze test		X	X	X	X										
MST 53 – Damp heat test 200 h		X	X												
MST 53 – Damp heat test 1000 h						X									
MST 54 – UV test 15 KWh/m²					X										
MST 54 – UV test 60 KWh/m²		X	X												
MST 55 – Cold conditioning				X											
MST 56 – Dry heat conditioning				X											
Legend: X Test performed,															

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

Module type: TWMND-72HD570 (BOM7)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	P
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	P
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	P
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	P
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	P
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	P
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	N/A
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	N/A
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	7-M1	7-M2-1	7-M2-2	7-M3	7-M4	7-M6	7-M8	7-M10	7-M12	7-M14	7-M15	7-M16	7-fire1, 2, 3		
Control module								X							
MST 01 – Visual inspection	X	X	X	X	X	X	X	X	X	X	X	X	X		
MST 02 – Performance at STC								X							
MST 03 – Maximum power determination	X	X	X	X	X	X	X		X	X					
MST 04 – Insulation thickness test															
MST 05 – Durability of markings		X	X	X	X	X	X	X	X						
MST 06 – Sharp edge test		X	X	X	X	X	X	X	X						
MST 07 – Bypass diode functionality test		X	X	X	X	X	X	X	X						
MST 11 – Accessibility test	X	X	X	X	X	X	X								
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X	X	X	X	X	X				X				
MST 14 – Impulse voltage test										X					
MST 16 – Insulation test	X	X	X	X	X	X	X		X	X					
MST 17 – Wet leakage current test	X	X	X	X	X	X	X		X						
MST 21 – Temperature test															
MST 22 – Hot-spot endurance Test									X						
MST 23 – Fire Test													X		
MST 24 – Ignitability test												X			
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test															
MST 32 – Module breakage test											X				
MST 33 – Screw connections test															
MST 34 – Static mechanical load test						X									
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:	X														
MST 42 – Robustness of terminations test					X										
MST 51 – Thermal cycling test 50					X										
MST 51 - Thermal cycling test 200							X								
MST 52 – Humidity freeze test		X	X	X	X										
MST 53 – Damp heat test 200 h		X	X												
MST 53 – Damp heat test 1000 h						X									
MST 54 – UV test 15 KWh/m²					X										
MST 54 – UV test 60 KWh/m²		X	X												
MST 55 – Cold conditioning				X											
MST 56 – Dry heat conditioning				X											
Legend: X Test performed,															

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

Module type: TWMND-72HD570 (BOM8)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	P
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	P
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	P
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	P
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	P
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	P
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	N/A
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	N/A
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	8-M1	8-M2-1	8-M2-2	8-M3	8-M4	8-M6	8-M8	8-M10	8-M12	8-M14	8-M15	8-M16	8-fire1, 2, 3		
Control module								X							
MST 01 – Visual inspection	X	X	X	X	X	X	X	X	X	X	X	X	X		
MST 02 – Performance at STC								X							
MST 03 – Maximum power determination	X	X	X	X	X	X	X		X	X					
MST 04 – Insulation thickness test															
MST 05 – Durability of markings		X	X	X	X	X	X	X	X						
MST 06 – Sharp edge test		X	X	X	X	X	X	X	X						
MST 07 – Bypass diode functionality test		X	X	X	X	X	X	X	X						
MST 11 – Accessibility test	X	X	X	X	X	X	X								
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X	X	X	X	X	X				X				
MST 14 – Impulse voltage test										X					
MST 16 – Insulation test	X	X	X	X	X	X	X		X	X					
MST 17 – Wet leakage current test	X	X	X	X	X	X	X		X						
MST 21 – Temperature test															
MST 22 – Hot-spot endurance Test									X						
MST 23 – Fire Test													X		
MST 24 – Ignitability test												X			
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test															
MST 32 – Module breakage test											X				
MST 33 – Screw connections test															
MST 34 – Static mechanical load test						X									
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:	X														
MST 42 – Robustness of terminations test					X										
MST 51 – Thermal cycling test 50					X										
MST 51 - Thermal cycling test 200							X								
MST 52 – Humidity freeze test		X	X	X	X										
MST 53 – Damp heat test 200 h		X	X												
MST 53 – Damp heat test 1000 h						X									
MST 54 – UV test 15 KWh/m²					X										
MST 54 – UV test 60 KWh/m²		X	X												
MST 55 – Cold conditioning				X											
MST 56 – Dry heat conditioning				X											
Legend: X Test performed,															

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

Module type: TWMNH-48HC435 (BOM9)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	N/A
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	N/A
10.13	MST 16 – Insulation test .....:	See appended Table 9	N/A
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	N/A
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	N/A
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	N/A
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	N/A
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	N/A
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	N/A
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	N/A
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	N/A

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	N/A
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	N/A
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	N/A
10.15	MST 21 – Temperature Test.....:	See appended Table 32	N/A
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	N/A
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	N/A
10.21	MST 32 – Module breakage test.....:	See appended Table 38	N/A
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	N/A
10.1	MST 01 – Visual inspection .....:	See appended Table 43	N/A
10.6	MST 05 – Durability of markings.....:	See appended Table 44	N/A
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	N/A
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	N/A
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample															
MST item	Sample No.														
	9-fire1, 2, 3														
Control module															
MST 01 – Visual inspection	X														
MST 02 – Performance at STC															
MST 03 – Maximum power determination															
MST 04 – Insulation thickness test															
MST 05 – Durability of markings															
MST 06 – Sharp edge test															
MST 07 – Bypass diode functionality test															
MST 11 – Accessibility test															
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding															
MST 14 – Impulse voltage test															
MST 16 – Insulation test															
MST 17 – Wet leakage current test															
MST 21 – Temperature test															
MST 22 – Hot-spot endurance Test															
MST 23 – Fire Test	X														
MST 24 – Ignitability test															
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test															
MST 32 – Module breakage test															
MST 33 – Screw connections test															
MST 34 – Static mechanical load test															
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:															
MST 42 – Robustness of terminations test															
MST 51 – Thermal cycling test 50															
MST 51 - Thermal cycling test 200															
MST 52 – Humidity freeze test															
MST 53 – Damp heat test 200 h															
MST 53 – Damp heat test 1000 h															
MST 54 – UV test 15 KWh/m ²															
MST 54 – UV test 60 KWh/m ²															
MST 55 – Cold conditioning															
MST 56 – Dry heat conditioning															
Legend: X Test performed,															

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

Module type: TWMNH-48HD435 (BOM10)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	N/A
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	N/A
10.13	MST 16 – Insulation test .....:	See appended Table 9	N/A
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	N/A
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	N/A
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	N/A
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	N/A
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	N/A
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	N/A
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	N/A
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	N/A
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	N/A
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	N/A
10.15	MST 21 – Temperature Test.....:	See appended Table 32	N/A
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	N/A
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	N/A
10.21	MST 32 – Module breakage test.....:	See appended Table 38	N/A
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	N/A
10.1	MST 01 – Visual inspection .....:	See appended Table 43	N/A
10.6	MST 05 – Durability of markings.....:	See appended Table 44	N/A
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	N/A
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	N/A
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	10-fire1, 2, 3														
Control module															
MST 01 – Visual inspection	X														
MST 02 – Performance at STC															
MST 03 – Maximum power determination															
MST 04 – Insulation thickness test															
MST 05 – Durability of markings															
MST 06 – Sharp edge test															
MST 07 – Bypass diode functionality test															
MST 11 – Accessibility test															
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding															
MST 14 – Impulse voltage test															
MST 16 – Insulation test															
MST 17 – Wet leakage current test															
MST 21 – Temperature test															
MST 22 – Hot-spot endurance Test															
MST 23 – Fire Test	X														
MST 24 – Ignitability test															
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test															
MST 32 – Module breakage test															
MST 33 – Screw connections test															
MST 34 – Static mechanical load test															
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:															
MST 42 – Robustness of terminations test															
MST 51 – Thermal cycling test 50															
MST 51 - Thermal cycling test 200															
MST 52 – Humidity freeze test															
MST 53 – Damp heat test 200 h															
MST 53 – Damp heat test 1000 h															
MST 54 – UV test 15 KWh/m ²															
MST 54 – UV test 60 KWh/m ²															
MST 55 – Cold conditioning															
MST 56 – Dry heat conditioning															
Legend: X Test performed,															

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

Module type: TWMNH-48HD435 (BOM11)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	N/A
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	N/A
10.13	MST 16 – Insulation test .....:	See appended Table 9	N/A
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test .....:	See appended Table 12	N/A
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test .....:	See appended Table 12	N/A
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	N/A
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	N/A
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	N/A
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	N/A
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	N/A
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	N/A
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	N/A
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	N/A
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	N/A
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	N/A
10.15	MST 21 – Temperature Test.....:	See appended Table 32	N/A
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	N/A
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	N/A
10.21	MST 32 – Module breakage test.....:	See appended Table 38	N/A
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	N/A
10.1	MST 01 – Visual inspection .....:	See appended Table 43	N/A
10.6	MST 05 – Durability of markings.....:	See appended Table 44	N/A
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	N/A
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	N/A
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test .....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	11-fire1, 2, 3														
Control module															
MST 01 – Visual inspection	X														
MST 02 – Performance at STC															
MST 03 – Maximum power determination															
MST 04 – Insulation thickness test															
MST 05 – Durability of markings															
MST 06 – Sharp edge test															
MST 07 – Bypass diode functionality test															
MST 11 – Accessibility test															
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding															
MST 14 – Impulse voltage test															
MST 16 – Insulation test															
MST 17 – Wet leakage current test															
MST 21 – Temperature test															
MST 22 – Hot-spot endurance Test															
MST 23 – Fire Test	X														
MST 24 – Ignitability test															
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test															
MST 32 – Module breakage test															
MST 33 – Screw connections test															
MST 34 – Static mechanical load test															
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:															
MST 42 – Robustness of terminations test															
MST 51 – Thermal cycling test 50															
MST 51 - Thermal cycling test 200															
MST 52 – Humidity freeze test															
MST 53 – Damp heat test 200 h															
MST 53 – Damp heat test 1000 h															
MST 54 – UV test 15 KWh/m ²															
MST 54 – UV test 60 KWh/m ²															
MST 55 – Cold conditioning															
MST 56 – Dry heat conditioning															
Legend: X Test performed,															

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

Module type: TWMNH-48HC435 (BOM12)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	N/A
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	N/A
10.13	MST 16 – Insulation test .....:	See appended Table 9	N/A
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	N/A
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	N/A
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	N/A
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	N/A
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	N/A
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	N/A
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	N/A
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	N/A
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	N/A
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	N/A
10.15	MST 21 – Temperature Test.....:	See appended Table 32	N/A
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	N/A
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	N/A
10.21	MST 32 – Module breakage test.....:	See appended Table 38	N/A
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test.....:	See appended Table 12	N/A
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	N/A
10.1	MST 01 – Visual inspection .....:	See appended Table 43	N/A
10.6	MST 05 – Durability of markings.....:	See appended Table 44	N/A
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	N/A
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	N/A
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test .....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	12-fire1, 2, 3														
Control module															
MST 01 – Visual inspection	X														
MST 02 – Performance at STC															
MST 03 – Maximum power determination															
MST 04 – Insulation thickness test															
MST 05 – Durability of markings															
MST 06 – Sharp edge test															
MST 07 – Bypass diode functionality test															
MST 11 – Accessibility test															
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding															
MST 14 – Impulse voltage test															
MST 16 – Insulation test															
MST 17 – Wet leakage current test															
MST 21 – Temperature test															
MST 22 – Hot-spot endurance Test															
MST 23 – Fire Test	X														
MST 24 – Ignitability test															
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test															
MST 32 – Module breakage test															
MST 33 – Screw connections test															
MST 34 – Static mechanical load test															
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:															
MST 42 – Robustness of terminations test															
MST 51 – Thermal cycling test 50															
MST 51 - Thermal cycling test 200															
MST 52 – Humidity freeze test															
MST 53 – Damp heat test 200 h															
MST 53 – Damp heat test 1000 h															
MST 54 – UV test 15 KWh/m ²															
MST 54 – UV test 60 KWh/m ²															
MST 55 – Cold conditioning															
MST 56 – Dry heat conditioning															
Legend: X Test performed,															

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

Module type: TWMNH-48HC435 (BOM13)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	N/A
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	N/A
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	N/A
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	N/A
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	N/A
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P

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Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	P
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	P
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	P
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	13-M1	13-M4	13-M6	13-M8	13-M10	13-M12	13-M13	13-M14	13-M15	13-M16	13-fire1, 2, 3				
Control module					X										
MST 01 – Visual inspection	X	X	X	X	X	X	X	X	X	X	X				
MST 02 – Performance at STC					X										
MST 03 – Maximum power determination	X	X	X	X		X	X	X							
MST 04 – Insulation thickness test															
MST 05 – Durability of markings		X	X	X	X	X	X								
MST 06 – Sharp edge test		X	X	X	X	X	X								
MST 07 – Bypass diode functionality test		X	X	X	X	X	X								
MST 11 – Accessibility test	X	X	X	X											
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X	X	X					X						
MST 14 – Impulse voltage test								X							
MST 16 – Insulation test	X	X	X	X		X	X	X							
MST 17 – Wet leakage current test	X	X	X	X		X	X								
MST 21 – Temperature test							X								
MST 22 – Hot-spot endurance Test						X									
MST 23 – Fire Test											X				
MST 24 – Ignitability test										X					
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test							X								
MST 32 – Module breakage test									X						
MST 33 – Screw connections test															
MST 34 – Static mechanical load test			X												
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:	X														
MST 42 – Robustness of terminations test		X													
MST 51 – Thermal cycling test 50		X													
MST 51 - Thermal cycling test 200				X											
MST 52 – Humidity freeze test		X													
MST 53 – Damp heat test 200 h															
MST 53 – Damp heat test 1000 h			X												
MST 54 – UV test 15 KWh/m²		X													
MST 54 – UV test 60 KWh/m²															
MST 55 – Cold conditioning															
MST 56 – Dry heat conditioning															
Legend: X Test performed,															

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

Module type: TWMHF-66HD715 (BOM14)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	P
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	P
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	P
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	P
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	P
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	P
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P

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Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	P
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	P
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	14-M1	14-M2	14-M3	14-M4	14-M6	14-M8	14-M10	14-M11	14-M12	14-M13	14-M14	14-M15	14-M16	14-fire1, 2, 3	
Control module							X								
MST 01 – Visual inspection	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MST 02 – Performance at STC							X								
MST 03 – Maximum power determination	X	X	X	X	X	X		X	X	X	X				
MST 04 – Insulation thickness test															
MST 05 – Durability of markings		X	X	X	X	X	X	X	X	X					
MST 06 – Sharp edge test		X	X	X	X	X	X	X	X	X					
MST 07 – Bypass diode functionality test		X	X	X	X	X	X	X	X	X					
MST 11 – Accessibility test	X	X	X	X	X	X									
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X	X	X	X	X						X			
MST 14 – Impulse voltage test											X				
MST 16 – Insulation test	X	X	X	X	X	X		X	X	X	X				
MST 17 – Wet leakage current test	X	X	X	X	X	X		X	X	X					
MST 21 – Temperature test										X					
MST 22 – Hot-spot endurance Test									X						
MST 23 – Fire Test														X	
MST 24 – Ignitability test													X		
MST 25 – Bypass diode thermal test								X							
MST 26 – Reverse current overload test										X					
MST 32 – Module breakage test												X			
MST 33 – Screw connections test															
MST 34 – Static mechanical load test					X										
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:	X														
MST 42 – Robustness of terminations test				X											
MST 51 – Thermal cycling test 50				X											
MST 51 - Thermal cycling test 200						X									
MST 52 – Humidity freeze test		X	X	X											
MST 53 – Damp heat test 200 h		X													
MST 53 – Damp heat test 1000 h					X										
MST 54 – UV test 15 KWh/m²				X											
MST 54 – UV test 60 KWh/m²		X													
MST 55 – Cold conditioning			X												
MST 56 – Dry heat conditioning			X												
Legend: X Test performed,															

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

Module type: TWMHF-66HD715 (BOM15)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test .....:	See appended Table 12	N/A
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	N/A
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	N/A
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	N/A
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	N/A
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	N/A
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	N/A
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	N/A
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	P
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	P
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	P
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	15-M6	15-M8	15-M10	15-M12	15-M13	15-M14									
Control module			X												
MST 01 – Visual inspection	X	X	X	X	X	X									
MST 02 – Performance at STC			X												
MST 03 – Maximum power determination	X	X		X	X	X									
MST 04 – Insulation thickness test															
MST 05 – Durability of markings	X	X	X	X	X										
MST 06 – Sharp edge test	X	X	X	X	X										
MST 07 – Bypass diode functionality test	X	X	X	X	X										
MST 11 – Accessibility test	X	X													
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X													
MST 14 – Impulse voltage test						X									
MST 16 – Insulation test	X	X		X	X	X									
MST 17 – Wet leakage current test	X	X		X	X										
MST 21 – Temperature test					X										
MST 22 – Hot-spot endurance Test				X											
MST 23 – Fire Test															
MST 24 – Ignitability test															
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test					X										
MST 32 – Module breakage test															
MST 33 – Screw connections test															
MST 34 – Static mechanical load test	X														
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:															
MST 42 – Robustness of terminations test															
MST 51 – Thermal cycling test 50															
MST 51 - Thermal cycling test 200		X													
MST 52 – Humidity freeze test															
MST 53 – Damp heat test 200 h															
MST 53 – Damp heat test 1000 h	X														
MST 54 – UV test 15 KWh/m ²															
MST 54 – UV test 60 KWh/m ²															
MST 55 – Cold conditioning															
MST 56 – Dry heat conditioning															
Legend: X Test performed,															

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

Module type: TWMNF-66HD705 (BOM16)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	N/A
10.9	MST 11 – Accessibility test .....:	See appended Table 12	N/A
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	N/A
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	N/A
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	N/A
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	N/A
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	N/A
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	N/A
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	N/A
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	P
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	P
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	N/A
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	N/A
10.18	MST 24 – Ignitability test .....:	See appended Table 37	N/A
10.21	MST 32 – Module breakage test.....:	See appended Table 38	N/A
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	16-M4	16-M6	16-M8	16-M10	16-M12	16-M13									
Control module				X											
MST 01 – Visual inspection	X	X	X	X	X	X									
MST 02 – Performance at STC				X											
MST 03 – Maximum power determination	X	X	X		X	X									
MST 04 – Insulation thickness test															
MST 05 – Durability of markings	X	X	X	X	X	X									
MST 06 – Sharp edge test	X	X	X	X	X	X									
MST 07 – Bypass diode functionality test	X	X	X	X	X	X									
MST 11 – Accessibility test	X	X	X												
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X	X												
MST 14 – Impulse voltage test															
MST 16 – Insulation test	X	X	X		X	X									
MST 17 – Wet leakage current test	X	X	X		X	X									
MST 21 – Temperature test						X									
MST 22 – Hot-spot endurance Test					X										
MST 23 – Fire Test															
MST 24 – Ignitability test															
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test						X									
MST 32 – Module breakage test															
MST 33 – Screw connections test															
MST 34 – Static mechanical load test		X													
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:															
MST 42 – Robustness of terminations test	X														
MST 51 – Thermal cycling test 50	X														
MST 51 - Thermal cycling test 200			X												
MST 52 – Humidity freeze test	X														
MST 53 – Damp heat test 200 h															
MST 53 – Damp heat test 1000 h		X													
MST 54 – UV test 15 KWh/m²	X														
MST 54 – UV test 60 KWh/m²															
MST 55 – Cold conditioning															
MST 56 – Dry heat conditioning															
Legend: X Test performed,															

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

Module type: TWMND-72HD575 (BOM20)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence B			
10.30	MST 53 – Damp heat test 200h .....:	See appended Table 14	P
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	P
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	P
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	P
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	P
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	P
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P

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Clause	Requirement + Test	Result - Remark	Verdict
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	P
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	P
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	P
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	20-M1	20-M2	20-M3	20-M4	20-M6	20-M8	20-M10	20-M12	20-M13	20-M14	20-M15	20-M16	20-fire1, 2, 3		
Control module							X								
MST 01 – Visual inspection	X	X	X	X	X	X	X	X	X	X	X	X	X		
MST 02 – Performance at STC							X								
MST 03 – Maximum power determination	X	X	X	X	X	X		X	X	X					
MST 04 – Insulation thickness test															
MST 05 – Durability of markings		X	X	X	X	X	X	X	X						
MST 06 – Sharp edge test		X	X	X	X	X	X	X	X						
MST 07 – Bypass diode functionality test		X	X	X	X	X	X	X	X						
MST 11 – Accessibility test	X	X	X	X	X	X									
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X	X	X	X	X					X				
MST 14 – Impulse voltage test										X					
MST 16 – Insulation test	X	X	X	X	X	X		X	X	X					
MST 17 – Wet leakage current test	X	X	X	X	X	X		X	X						
MST 21 – Temperature test									X						
MST 22 – Hot-spot endurance Test								X							
MST 23 – Fire Test													X		
MST 24 – Ignitability test												X			
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test									X						
MST 32 – Module breakage test											X				
MST 33 – Screw connections test															
MST 34 – Static mechanical load test					X										
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:	X														
MST 42 – Robustness of terminations test				X											
MST 51 – Thermal cycling test 50				X											
MST 51 - Thermal cycling test 200						X									
MST 52 – Humidity freeze test		X	X	X											
MST 53 – Damp heat test 200 h		X													
MST 53 – Damp heat test 1000 h					X										
MST 54 – UV test 15 KWh/m²				X											
MST 54 – UV test 60 KWh/m²		X													
MST 55 – Cold conditioning			X												
MST 56 – Dry heat conditioning			X												
Legend: X Test performed,															

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

Module type: TWMND-72HD575 (BOM21)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence B			
10.30	MST 53 – Damp heat test 200h .....:	See appended Table 14	P
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	P
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	P
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	P
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	P
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	P
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	P
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	P
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	P
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	21-M1	21-M2	21-M3	21-M4	21-M6	21-M8	21-M10	21-M12	21-M13	21-M14	21-M15	21-M16	21-fire1, 2, 3		
Control module							X								
MST 01 – Visual inspection	X	X	X	X	X	X	X	X	X	X	X	X	X		
MST 02 – Performance at STC							X								
MST 03 – Maximum power determination	X	X	X	X	X	X		X	X	X					
MST 04 – Insulation thickness test															
MST 05 – Durability of markings		X	X	X	X	X	X	X	X						
MST 06 – Sharp edge test		X	X	X	X	X	X	X	X						
MST 07 – Bypass diode functionality test		X	X	X	X	X	X	X	X						
MST 11 – Accessibility test	X	X	X	X	X	X									
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X	X	X	X	X					X				
MST 14 – Impulse voltage test										X					
MST 16 – Insulation test	X	X	X	X	X	X		X	X	X					
MST 17 – Wet leakage current test	X	X	X	X	X	X		X	X						
MST 21 – Temperature test									X						
MST 22 – Hot-spot endurance Test								X							
MST 23 – Fire Test													X		
MST 24 – Ignitability test												X			
MST 25 – Bypass diode thermal test															
MST 26 – Reverse current overload test									X						
MST 32 – Module breakage test											X				
MST 33 – Screw connections test															
MST 34 – Static mechanical load test					X										
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:	X														
MST 42 – Robustness of terminations test				X											
MST 51 – Thermal cycling test 50				X											
MST 51 - Thermal cycling test 200						X									
MST 52 – Humidity freeze test		X	X	X											
MST 53 – Damp heat test 200 h		X													
MST 53 – Damp heat test 1000 h					X										
MST 54 – UV test 15 KWh/m²				X											
MST 54 – UV test 60 KWh/m²		X													
MST 55 – Cold conditioning			X												
MST 56 – Dry heat conditioning			X												
Legend: X Test performed,															

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

Module type: TWMNH-66HD615 (BOM22)

10 TEST PROCEDURES			
10.1 General: Safety qualification testing included the following Module Safety Tests (MST) of IEC 61730-2			
Initial Testing			
10.2	MST 01 – Visual inspection .....:	See appended Table 6	P
10.3	MST 02 - Performance at STC .....:	See appended Table 7	P
10.4	MST 03 – Maximum power determination .....:	See appended Table 8	P
10.13	MST 16 – Insulation test .....:	See appended Table 9	P
10.14	MST 17 – Wet leakage current test .....:	See appended Table 10	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence A			
10.26	MST 37 – Materials creep test.....:	See appended Table 13	P
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test .....:	See appended Table 12	P
Sequence B			
10.30	MST 53 – Damp heat test 200h.....:	See appended Table 14	P
10.31	MST 54 – UV test (front side) 60kWh/m ².....:	See appended Table 15	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 16	P
10.31	MST 54 – UV test (back side) 60kWh/m ².....:	See appended Table 17	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 18	P
Sequence B1			
10.32	MST 55 – Cold conditioning.....:	See appended Table 19	P
10.33	MST 56 – Dry heat conditioning .....:	See appended Table 20	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 21	P
10.32	MST 55 – Cold conditioning.....:	See appended Table 22	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 23	P
Sequence C			
10.31	MST 54 – UV test 15kWh/m ².....:	See appended Table 24	P
10.28	MST 51 – Thermal cycling 50 test .....:	See appended Table 25	P
10.29	MST 52 – Humidity freeze test .....:	See appended Table 26	P
10.27	MST 42 – Robustness of terminations test.....:	See appended Table 27	P

IEC 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence D			
10.30	MST 53 – Damp heat test.....:	See appended Table 28	P
10.23	MST 34 – Static mechanical load test .....:	See appended Table 29	P
Sequence E			
10.28	MST 51 – Thermal cycling 200 test .....:	See appended Table 30	N/A
Sequence F			
10.19	MST 25 – Bypass diode thermal test.....:	See appended Table 31	N/A
10.16	MST 22 – Hot-spot endurance Test.....:	See appended Table 33	P
10.15	MST 21 – Temperature Test.....:	See appended Table 32	P
10.20	MST 26 – Reverse current overload test.....:	See appended Table 34	P
Sequence G			
10.12	MST 14 – Impulse voltage test .....:	See appended Table 35.2	P
Other tests			
10.17	MST 23 – Fire Test .....:	See appended Table 36	P
10.18	MST 24 – Ignitability test .....:	See appended Table 37	P
10.21	MST 32 – Module breakage test.....:	See appended Table 38	P
10.24	MST 35 – Peel test .....:	See appended Table 39	N/A
10.25	MST 36 – Lap shear strength test .....:	See appended Table 40	N/A
Final Testing			
10.10	MST 12 – Cut susceptibility test .....:	See appended Table 41	N/A
10.11	MST 13 – Continuity test of equipotential bonding:	See appended Table 11	P
10.9	MST 11 – Accessibility test.....:	See appended Table 12	P
10.4	MST 03 – Maximum power determination.....:	See appended Table 42	P
10.1	MST 01 – Visual inspection .....:	See appended Table 43	P
10.6	MST 05 – Durability of markings.....:	See appended Table 44	P
10.7	MST 06 – Sharp edge test.....:	See appended Table 45	P
10.8	MST 07 – Bypass diode functionality test.....:	See appended Table 46	P
10.22	MST 33a – General screw connections test.....:	See appended Table 47	N/A
10.22	MST 33b – Locking Screw connections test.....:	See appended Table 48	N/A
10.5	MST 04 – Insulation thickness test.....:	See appended Table 49	N/A
Supplementary information: N/A			

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

Table 3: Overview of MST items for each test sample

MST item	Sample No.														
	22-M1	22-M2	22-M3	22-M4	22-M6	22-M8	22-M10	22-M11	22-M12	22-M13	22-M14	22-M15	22-M16	22-fire1, 2, 3	
Control module							X								
MST 01 – Visual inspection	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MST 02 – Performance at STC							X								
MST 03 – Maximum power determination	X	X	X	X	X	X		X	X	X	X				
MST 04 – Insulation thickness test															
MST 05 – Durability of markings		X	X	X	X	X	X	X	X	X					
MST 06 – Sharp edge test		X	X	X	X	X	X	X	X	X					
MST 07 – Bypass diode functionality test		X	X	X	X	X	X	X	X	X					
MST 11 – Accessibility test	X	X	X	X	X	X									
MST 12 – Cut susceptibility test															
MST 13 – Continuity test of equipotential bonding	X	X	X	X	X	X						X			
MST 14 – Impulse voltage test											X				
MST 16 – Insulation test	X	X	X	X	X	X		X	X	X	X				
MST 17 – Wet leakage current test	X	X	X	X	X	X		X	X	X					
MST 21 – Temperature test										X					
MST 22 – Hot-spot endurance Test									X						
MST 23 – Fire Test														X	
MST 24 – Ignitability test													X		
MST 25 – Bypass diode thermal test								X							
MST 26 – Reverse current overload test										X					
MST 32 – Module breakage test												X			
MST 33 – Screw connections test															
MST 34 – Static mechanical load test					X										
MST 35 – Peel test															
MST 36 – Lap shear strength test:															
MST 37 – Materials creep test:	X														
MST 42 – Robustness of terminations test				X											
MST 51 – Thermal cycling test 50				X											
MST 51 - Thermal cycling test 200						X									
MST 52 – Humidity freeze test		X	X	X											
MST 53 – Damp heat test 200 h		X													
MST 53 – Damp heat test 1000 h					X										
MST 54 – UV test 15 KWh/m²				X											
MST 54 – UV test 60 KWh/m²		X													
MST 55 – Cold conditioning			X												
MST 56 – Dry heat conditioning			X												
Legend: X Test performed,															

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

Test Results

Module type: TWMND-72HD570 (BOM1)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-04-09	—
Sample # 1-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 1-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 1-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	1-M10						—
Test Date [YYYY-MM-DD] .....:	2024-04-11						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	13.75±3%						—
Rated V_{OC} including manufacturing tolerances..:	51.90±3%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	13.58	51.98	12.88	44.08	567.6	80.42	—
Rear	10.81	51.49	9.43	45.56	429.7	77.23	—
BNPI	14.97	52.18	14.17	44.16	626.0	80.17	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-04-11						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
1-M6	13.58	51.89	12.89	44.03	567.6	80.56	—
Supplementary information: N/A							

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

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-04-11		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
1-M6	>1000	>15.5	No breakdown	×	P
1-M10	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

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

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-04-11	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		< 3500	—
Solution temperature [℃] .....:		23.3	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
1-M6	>1000	>15.5	P
1-M10	>1000	>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :		2024-04-11		—
Test Date **Final** examination [YYYY-MM-DD] ... :		2024-04-12		—
Maximum over-current protection rating [A]..... :		30		—
Current applied [A] ..... :		75		—
Location of designated grounding point ..... :		The ground hole of one longer side		—
Location of second contacting point..... :		A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side		—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
1-M6	Initial examination	N/A	A: 0.004 B: 0.004 C: 0.004	P
	Preconditioning: MST 34			—
	Final examination	N/A	A: 0.004 B: 0.005 C: 0.004	P
1-M15	Initial examination	N/A	A: 0.004 B: 0.005 C: 0.004	P
	Preconditioning: MST 32			—
	Final examination	N/A	A: 0.005 B: 0.005 C: 0.004	P
Supplementary information: N/A				

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

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-04-11	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-04-12	—
Sample #	Position in test sequence:		
1-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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

SEQUENCE A		
Sample #	N/A	—
Table 13: MST 37 - Materials creep test		N/A

SEQUENCE B	
Table 14: MST 53 - Damp heat test	N/A

Table 15: MST 54 - UV test (front side)	N/A

Table 17: MST 54 - UV test (back side)	N/A

Table21: MST 52 - Humidity freeze test	N/A

SEQUENCE B1		
Sample #	N/A	—
Table 19: MST 55 - Cold conditioning		N/A

Table 20: MST 56 - Dry heat conditioning	N/A

Table21: MST 52 - Humidity freeze test	N/A

Table 22: MST 55 - Cold conditioning	N/A

Table 23: MST 52 - Humidity freeze test	N/A

SEQUENCE C		
Sample #	N/A	—
Table 24: MST 54 - UV test		N/A

Table 25: MST 51 - Thermal cycling test	N/A

Table 23: MST 52 - Humidity freeze test	N/A

Table 27: MST 42 - Robustness of terminations test	N/A

SEQUENCE D		
Sample #	4-M6	—
Table 28: MST 53 - Damp heat test		N/A

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

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-04-12		—
Mounting method ....:	Clamps mounting (8 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor γm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-12		—
Findings .... :	☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-12		—
Cemented joints....:	☐ Yes ☒ No		—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-12		—
Cemented joints....:	☐ Yes ☒ No		—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2325		—
Solution temperature [℃] .... :	23.4		—
Measured [MΩ]		Required [MΩ]	Result
>1000		>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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

SEQUENCE E		
Sample #	N/A	—
Table 30: MST 51 - Thermal cycling test		N/A

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

Sample #	N/A	—
Table 33: MST 22 - Hot-spot endurance test		N/A

Sample #	N/A	—
Table 32: MST 21 - Temperature Test		N/A

Sample #	N/A	—
Table 34: MST 26 - Reverse current overload test		N/A

SEQUENCE G		
Sample #:	N/A	—
Table 35.2: MST 14 - Impulse voltage test		N/A

OTHER TESTS		
Sample #:	N/A	—
Table 36: MST 23 - Fire test		N/A

Sample #:	N/A	—
Table 37: MST 24 - Ignitability test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	1-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:	2024-04-12		—
Weight of impactor [kg] .....:	45.5		—
Thickness of sample [mm].....:	30		—
Mounting technique used.....:	Clamps mounting (8 points on long side with 2 beams across the module at the long sides)		—
Module breakage .....:	☒	No breakage	—
	☒	No separation from frame or mounting structure	—
	☐	Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
	☐	Breakage occurred, no particles larger than 65 cm^2ejected from sample	—
	☐	Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD].....:			2024-04-12			—
Module temperature [℃].....:			25			—
Irradiance [W/m²].....:			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A)	Vmp [V]	Pmp [W]	FF [%]
1-M6	13.56	52.05	12.94	44.21	571.9	81.00
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-04-12	—
Sample # 1-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 1-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings							P
Test Date [YYYY-MM-DD]....:		2024-04-12					—
Sample #	Markings legible		Not easily removable		No curling		Result
1-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
1-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD]....:	2024-04-12			—
Sample #	The black indicating tape is visible through the resulting cut.			Result
1-M10	☒ Yes	☐ No		P
1-M6	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD]....:		2024-04-12		—
☐ **Method A**				—
Ambient temperature [℃]....:		N/A		—
Current flow applied [A]....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
1-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
1-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD].... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD].... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMND-72HD580 (BOM2)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-04-09	—
Sample # 2-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 2-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 2-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	2-M10						—
Test Date [YYYY-MM-DD] .....:	2024-04-11						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	13.85±3%						—
Rated V_{OC} including manufacturing tolerances..:	52.30±3%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	13.61	51.98	12.96	44.83	581.0	80.38	—
Rear	10.58	52.52	9.88	45.77	452.5	81.44	—
BNPI	15.03	53.26	14.28	44.84	640.4	79.99	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-04-11						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
2-M6	13.61	51.89	12.96	44.75	580.0	80.38	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-04-11		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
2-M6	>1000	>15.5	No breakdown	×	P
2-M10	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

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

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-04-11	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		< 3500	—
Solution temperature [℃] .....:		23.3	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
2-M6	>1000	>15.5	P
2-M10	>1000	>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :		2024-04-11		—
Test Date **Final** examination [YYYY-MM-DD] ... :		2024-04-12		—
Maximum over-current protection rating [A]..... :		30		—
Current applied [A] ..... :		75		—
Location of designated grounding point ..... :		The ground hole of one longer side		—
Location of second contacting point..... :		A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side		—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
2-M6	Initial examination	N/A	A: 0.004 B: 0.005 C: 0.004	P
	Preconditioning: MST 34			—
	Final examination	N/A	A: 0.005 B: 0.005 C: 0.004	P
2-M10	Initial examination	N/A	A: 0.004 B: 0.005 C: 0.004	P
	Preconditioning: MST 32			—
	Final examination	N/A	A: 0.005 B: 0.005 C: 0.004	P
Supplementary information: N/A				

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

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-04-11	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-04-12	—
Sample #	Position in test sequence:		
2-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A		
Sample #	N/A	—
Table 13: MST 37 - Materials creep test		N/A

SEQUENCE B	
Table 14: MST 53 - Damp heat test	N/A

Table 15: MST 54 - UV test (front side)	N/A

Table 17: MST 54 - UV test (back side)	N/A

Table18: MST 52 - Humidity freeze test	N/A

SEQUENCE B1		
Sample #	N/A	—
Table 19: MST 55 - Cold conditioning		N/A

Table 20: MST 56 - Dry heat conditioning	N/A

Table21: MST 52 - Humidity freeze test	N/A

Table 22: MST 55 - Cold conditioning	N/A

Table 23: MST 52 - Humidity freeze test	N/A

SEQUENCE C		
Sample #	N/A	—
Table 24: MST 54 - UV test		N/A

Table 25: MST 51 - Thermal cycling test	N/A

Table 26: MST 52 - Humidity freeze test	N/A

Table 27: MST 42 - Robustness of terminations test	N/A

SEQUENCE D		
Sample #	2-M6	—
Table 28: MST 53 - Damp heat test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-04-12		—
Mounting method ....:	Clamps mounting (8 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor γm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-12		—
Findings .... :	☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-12		—
Cemented joints....:	☐ Yes ☒ No		—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-12		—
Cemented joints....:	☐ Yes ☒ No		—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2325		—
Solution temperature [℃] .... :	23.4		—
Measured [MΩ]		Required [MΩ]	Result
>1000		>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE E		
Sample #	N/A	—
Table 30: MST 51 - Thermal cycling test		N/A

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

Sample #	N/A	—
Table 33: MST 22 - Hot-spot endurance test		N/A

Sample #	N/A	—
Table 32: MST 21 - Temperature Test		N/A

Sample #	N/A	—
Table 34: MST 26 - Reverse current overload test		N/A

SEQUENCE G		
Sample #:	N/A	—
Table 35.2: MST 14 - Impulse voltage test		N/A

OTHER TESTS		
Sample #:	N/A	—
Table 36: MST 23 - Fire test		N/A

Sample #:	N/A	—
Table 37: MST 24 - Ignitability test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	2-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:	2024-04-12		—
Weight of impactor [kg] .....:	45.5		—
Thickness of sample [mm].....:	30		—
Mounting technique used.....:	Clamps mounting (8 points on long side with 2 beams across the module at the long sides)		—
Module breakage .....:	☒	No breakage	—
	☒	No separation from frame or mounting structure	—
	☐	Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
	☐	Breakage occurred, no particles larger than 65 cm^2ejected from sample	—
	☐	Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....::			2024-04-12			—
Module temperature [℃]....::			25			—
Irradiance [W/m²]....::			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A)	Vmp [V]	Pmp [W]	FF [%]
2-M6	13.64	53.14	12.91	44.92	579.8	80.02
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-04-12	—
Sample # 2-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 2-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings							P
Test Date [YYYY-MM-DD].....:		2024-04-12					—
Sample #	Markings legible		Not easily removable		No curling		Result
2-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
2-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 45: MST 06 - Sharp edge test			P
Test Date [YYYY-MM-DD].....:		2024-04-12	—
Sample #	The black indicating tape is visible through the resulting cut.		Result
2-M10	☒ Yes	☐ No	P
2-M6	☒ Yes	☐ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD]....:		2024-04-12		—
☐ **Method A**				—
Ambient temperature [℃]....:		N/A		—
Current flow applied [A]....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
2-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
2-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD].... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD].... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMND-72HD585 (BOM3)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-04-01	—
Sample # 3-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 3-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 3-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	3-M10						—
Test Date [YYYY-MM-DD] .....:	2024-04-03						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	13.90±3%						—
Rated V_{OC} including manufacturing tolerances..:	52.50±3%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	13.59	53.06	12.90	45.52	587.1	81.39	—
Rear	13.04	44.85	12.25	38.13	467.1	79.87	—
BNPI	15.02	53.24	14.21	45.61	648.1	81.07	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-04-03						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
3-M6	13.63	53.15	12.89	45.52	586.5	80.96	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-04-03		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
3-M6	>1000	>15.5	No breakdown	×	P
3-M10	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-04-03	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		< 3500	—
Solution temperature [℃] .....:		23.3	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
3-M6	>1000	>15.5	P
3-M10	>1000	>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :		2024-04-03		—
Test Date **Final** examination [YYYY-MM-DD] ... :		2024-04-07		—
Maximum over-current protection rating [A]..... :		30		—
Current applied [A] ..... :		75		—
Location of designated grounding point ..... :		The ground hole of one longer side		—
Location of second contacting point..... :		A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side		—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
3-M6	Initial examination	N/A	A: 0.004 B: 0.005 C: 0.004	P
	Preconditioning: MST 34			—
	Final examination	N/A	A: 0.004 B: 0.005 C: 0.005	P
3-M15	Initial examination	N/A	A: 0.004 B: 0.005 C: 0.004	P
	Preconditioning: MST 32			—
	Final examination	N/A	A: 0.005 B: 0.005 C: 0.004	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-04-03	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-04-07	—
Sample #	Position in test sequence:		
3-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A		
Sample #	N/A	—
Table 13: MST 37 - Materials creep test		N/A

SEQUENCE B	
Table 14: MST 53 - Damp heat test	N/A

Table 15: MST 54 - UV test (front side)	N/A

Table 17: MST 54 - UV test (back side)	N/A

Table21: MST 52 - Humidity freeze test	N/A

SEQUENCE B1		
Sample #	N/A	—
Table 19: MST 55 - Cold conditioning		N/A

Table 20: MST 56 - Dry heat conditioning	N/A

Table21: MST 52 - Humidity freeze test	N/A

Table 19: MST 55 - Cold conditioning	N/A

Table 20: MST 52 - Humidity freeze test	N/A

SEQUENCE C		
Sample #	N/A	—
Table 24: MST 54 - UV test		N/A

Table 25: MST 51 - Thermal cycling test	N/A

Table 23: MST 52 - Humidity freeze test	N/A

Table 27: MST 42 - Robustness of terminations test	N/A

SEQUENCE D		
Sample #	3-M6	—
Table 28: MST 53 - Damp heat test		N/A

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

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-04-03		—
Mounting method ....:	Clamps mounting (8 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor γm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-03		—
Findings .... :	☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-03		—
Cemented joints....:	☐ Yes ☒ No		—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-03		—
Cemented joints....:	☐ Yes ☒ No		—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2332		—
Solution temperature [℃] .... :	23.3		—
Measured [MΩ]		Required [MΩ]	Result
>1000		>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE E		
Sample #	N/A	—
Table 30: MST 51 - Thermal cycling test		N/A

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

Sample #	N/A	—
Table 33: MST 22 - Hot-spot endurance test		N/A

Sample #	N/A	—
Table 32: MST 21 - Temperature Test		N/A

Sample #	N/A	—
Table 34: MST 26 - Reverse current overload test		N/A

SEQUENCE G		
Sample #:	N/A	—
Table 35.2: MST 14 - Impulse voltage test		N/A

OTHER TESTS		
Sample #:	N/A	—
Table 36: MST 23 - Fire test		N/A

Sample #:	N/A	—
Table 37: MST 24 - Ignitability test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	3-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:	2024-04-07		—
Weight of impactor [kg] .....:	45.5		—
Thickness of sample [mm].....:	30		—
Mounting technique used.....:	Clamps mounting (8 points on long side with 2 beams across the module at the long sides)		—
Module breakage .....:	☒	No breakage	—
	☒	No separation from frame or mounting structure	—
	☐	Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
	☐	Breakage occurred, no particles larger than 65 cm^2ejected from sample	—
	☐	Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD].....:			2024-04-03			—
Module temperature [℃].....:			25			—
Irradiance [W/m²].....:			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A)	Vmp [V]	Pmp [W]	FF [%]
3-M6	13.58	53.09	12.85	45.68	587.2	81.44
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-04-03	—
Sample # 3-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 3-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings							P
Test Date [YYYY-MM-DD]....:		2024-04-03					—
Sample #	Markings legible		Not easily removable		No curling		Result
3-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
3-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD]....:	2024-04-03			—
Sample #	The black indicating tape is visible through the resulting cut.			Result
3-M10	☒ Yes	☐ No		P
3-M6	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD]....:		2024-04-03		—
☐ **Method A**				—
Ambient temperature [℃]....:		N/A		—
Current flow applied [A]....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—
Sample #	IV curve after shading			Result
	Diode 1 working properly	Diode 2 working properly	Diode 3 working properly	
3-M6	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
3-M10	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
Supplementary information: N/A				

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD].... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD].... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMND-72HD570 (BOM4)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-01-11	—
Sample # 4-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M2-1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M2-2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—

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Clause	Requirement + Test	Result - Remark	Verdict
Sample # 4-M16	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	4-M10						—
Test Date [YYYY-MM-DD] .....:	2024-01-11						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	13.75±3%						—
Rated V_{OC} including manufacturing tolerances..:	51.90±3%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	13.523	51.771	12.871	44.267	569.77	81.38	—
Rear	10.395	51.336	9.633	45.024	433.74	81.28	—
BNPI	14.908	51.948	14.202	44.281	628.90	81.20	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-01-11						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
4-M1	13.523	51.771	12.871	44.267	569.77	81.38	—
4-M2-1	13.503	51.659	12.867	44.101	567.46	81.35	—
4-M2-2	13.544	51.616	12.843	44.142	566.92	81.09	—
4-M3	13.542	51.666	12.865	44.190	568.50	81.25	—
4-M4	13.533	51.621	12.858	44.142	567.59	81.25	—
4-M6	13.451	51.701	12.843	44.107	566.48	81.46	—
4-M12	13.544	51.675	12.870	44.147	568.18	81.18	—
4-M13	13.539	51.677	12.887	44.146	568.91	81.31	—
4-M14	13.579	51.661	12.889	44.104	568.45	81.03	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-01-11		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
4-M1	>1000	>15.5	No breakdown	×	P
4-M2-1	>1000	>15.5	No breakdown	×	P
4-M2-2	>1000	>15.5	No breakdown	×	P
4-M3	>1000	>15.5	No breakdown	×	P
4-M4	>1000	>15.5	No breakdown	×	P
4-M6	>1000	>15.5	No breakdown	×	P
4-M10	>1000	>15.5	No breakdown	×	P
4-M12	>1000	>15.5	No breakdown	×	P
4-M13	>1000	>15.5	No breakdown	×	P
4-M14	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-01-11	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		1982	—
Solution temperature [℃] .....:		22.8	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
4-M1	>1000	>15.5	P
4-M2-1	>1000	>15.5	P
4-M2-2	>1000	>15.5	P
4-M3	>1000	>15.5	P
4-M4	>1000	>15.5	P
4-M6	>1000	>15.5	P
4-M10	>1000	>15.5	P
4-M12	>1000	>15.5	P
4-M13	>1000	>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :	2024-01-11			—
Test Date **Final** examination [YYYY-MM-DD] ... :	2024-02-19 for 4-M1# 2024-04-01 for 4-M2-1#, 4-M2-2#, 4-M3#, 4-M12#, 4-M13# 2024-04-09 for 4-M4# 2024-03-01 for 4-M15#			—
Maximum over-current protection rating [A]..... :	30			—
Current applied [A] ..... :	75			—
Location of designated grounding point ..... :	The ground hole of one longer side			—
Location of second contacting point..... :	A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side			—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
4-M1	Initial examination	A: 0.135 B: 0.198 C: 0.189	A: 0.002 B: 0.003 C: 0.003	P
	Preconditioning: MST 37			—
	Final examination	A: 0.143 B: 0.176 C: 0.169	A: 0.002 B: 0.002 C: 0.002	P
4-M2-1	Initial examination	A: 0.281 B: 0.251 C: 0.257	A: 0.004 B: 0.003 C: 0.003	P
	Preconditioning: MST 53, MST 54, MST 52			—
	Final examination	A: 0.231 B: 0.265 C: 0.258	A: 0.003 B: 0.004 C: 0.003	P
4-M2-2	Initial examination	A: 0.216 B: 0.225 C: 0.220	A: 0.003 B: 0.003 C: 0.003	P
	Preconditioning: MST 53, MST 54, MST 52			—
	Final examination	A: 0.229 B: 0.219 C: 0.214	A: 0.003 B: 0.003 C: 0.003	P

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Clause	Requirement + Test	Result - Remark		Verdict
4-M3	Initial examination	A: 0.211 B: 0.201 C: 0.196	A: 0.003 B: 0.003 C: 0.003	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52			—
	Final examination	A: 0.234 B: 0.297 C: 0.240	A: 0.003 B: 0.004 C: 0.003	P
4-M4	Initial examination	A: 0.264 B: 0.278 C: 0.267	A: 0.004 B: 0.004 C: 0.004	P
	Preconditioning: MST 54, MST 51, MST 52			—
	Final examination	A: 0.288 B: 0.217 C: 0.222	A: 0.004 B: 0.003 C: 0.003	P
4-M6	Initial examination	A: 0.264 B: 0.259 C: 0.254	A: 0.004 B: 0.003 C: 0.003	P
	Preconditioning: MST 53, MST 34,			—
	Final examination	A: 0.251 B: 0.243 C: 0.247	A: 0.003 B: 0.003 C: 0.003	P
4-M15	Initial examination	A: 0.196 B: 0.187 C: 0.193	A: 0.003 B: 0.002 C: 0.003	P
	Preconditioning: MST 32			—
	Final examination	A: 0.201 B: 0.219 C: 0.208	A: 0.003 B: 0.003 C: 0.003	P
4-M18	Initial examination	A: 0.217 B: 0.221 C: 0.213	A: 0.003 B: 0.003 C: 0.003	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.208 B: 0.216 C: 0.228	A: 0.003 B: 0.003 C: 0.003	P

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Clause	Requirement + Test	Result - Remark		Verdict
4-M19	Initial examination	A: 0.286 B: 0.279 C: 0.281	A: 0.004 B: 0.004 C: 0.004	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.275 B: 0.269 C: 0.270	A: 0.004 B: 0.004 C: 0.004	P
4-M20	Initial examination	A: 0.223 B: 0.198 C: 0.194	A: 0.003 B: 0.003 C: 0.003	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.233 B: 0.245 C: 0.240	A: 0.003 B: 0.003 C: 0.003	P
4-M21	Initial examination	A: 0.156 B: 0.167 C: 0.169	A: 0.002 B: 0.002 C: 0.002	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.178 B: 0.165 C: 0.162	A: 0.002 B: 0.002 C: 0.002	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-01-11	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-02-19 for 4-M1# 2024-04-01 for 4-M2-1#, 4-M2-2#, 4-M3#, 4-M12#, 4-M13# 2024-04-09 for 4-M4#	—
Sample #	Position in test sequence:		
4-M1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 37, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
4-M2-1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
4-M2-2	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
4-M3	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52, MST13		—
	Final examination, access?	☐ Yes ☒ No	P
4-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
4-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A				
Sample #	4-M1			—
Table 13: MST 37 - Materials creep test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-09/2024-02-18		—
Duration [h] .....:		200		—
Applied temperature [℃] .....:		105 ± 5		—
MST 01: Visual inspection after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-02-18		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
Supplementary information: For clearance and creepage distances see table 1.				
MST 16: Insulation test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-02-18		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-02-18		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied (V, dc) .....:		2 minutes of 1500		—
Solution resistivity (Ω cm) .....:		<3500		—
Solution temperature (℃).....:		22.7		—
Measured(MΩ)		Required (MΩ)		Result
>1000		>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B					
Table 14: MST 53 - Damp heat test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-01-15/2024-01-23		—
Applied load [N] .....:			N/A		—
Duration [h] .....:			200		—
Sample #			—		—
4-M2-1			—		—
4-M2-2			—		—
MST 01: Visual inspection after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-01-23		—
Sample # 4-M2-1	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
Sample # 4-M2-2	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-01-23		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
4-M2-1	>1000	>15.5	No breakdown	×	P
4-M2-2	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

Table 15: MST 54 - UV test (front side)			P
Sample #	4-M2-1		—
Test Date [YYYY-MM-DD] start/end .....:		2024-01-26/2024-02-18	—
Module temperature [℃] .....:		60	—
Irradiation total [kWh/m²] .....:		60.0	—
Open circuits .....:		☐ Yes ☒ No	P
MST 01: Visual inspection after UV test			—
Test Date [YYYY-MM-DD].....:		2024-02-18	—

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Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-18		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²] This test is conducted in compliance with IEC 61730-2:2023.				

Table 17: MST 54 - UV test (back side)				P
Sample #	4-M2-2			—
Test Date [YYYY-MM-DD] start/end ..... :		2024-01-26/2024-02-18		—
Module temperature [℃] ..... :		60		—
Irradiation total [kWh/m²] ..... :		60.0		—
Open circuits ..... :		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-18		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-18		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²] This test is conducted in compliance with IEC 61730-2:2023.				

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

Table19: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-03-18/2024-03-29		—
Total cycles .....:			10		—
Open circuits .....:			☐ Yes ☒ No		P
Sample #	—				—
4-M2-1	—				—
4-M2-2	—				—
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:			2024-03-29		—
Findings ..... :			☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos			No visual defects		—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:			2024-03-29		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
4-M2-1	>1000	>15.5	No breakdown	x	P
4-M2-2	>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test					—
Test Date [YYYY-MM-DD].....:			2024-03-29		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:			2 minutes of 1500		—
Solution resistivity [Ω cm) .....:			<3500		—
Solution temperature [℃] .....:			23.7		—
Sample #	Measured (MΩ)		Required (MΩ)		Result
4-M2-1	>1000		>15.5		P
4-M2-2	>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]					

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

SEQUENCE B1				
Sample #	4-M3			—
Table 19: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-15/2024-01-17		—
Temperature [℃] Duration [h] .....:		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-17		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-17		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 20: MST 56 - Dry heat conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-09/2024-02-18		—
Temperature [℃] Duration [h] ..... :		105 ± 5 / 200		—
MST 01: Visual inspection after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-18		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-18		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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

Table21: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-19/2024-03-01		—
Total cycles ..... :		10		—
Open circuits ..... :		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 22: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-04/2024-03-07		—
Temperature [℃] / Duration [h] ..... :		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-07		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-07		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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

Table 23: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-18/2024-03-29		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		< 3500		—
Solution temperature [℃] .....:		23.7		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

SEQUENCE C					
Sample #	4-M4				—
Table 24: MST 54 - UV test					P
Front side					
Test Date [YYYY-MM-DD] start/end .....:		2024-01-20/2024-01-25			—
Module temperature [℃] .....:		60.2/57.9			—
Irradiation total [kWh/ m²] .....:		15.0			—
Open circuits .....:		☐ Yes	☒ No		P
Back side (only for bifacial modules)					
Test Date [YYYY-MM-DD] start/end .....:		2024-01-25/2024-01-30			—
Module temperature [℃] .....:		59.5/56.9			—
Irradiation total [kWh/ m²] .....:		15.0			—
Open circuits .....:		☐ Yes	☒ No		P
MST 01: Visual inspection after UV test					—
Test Date [YYYY-MM-DD].....:		2024-01-30			—
Findings ..... :		☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after UV test					—
Test Date [YYYY-MM-DD].....:		2024-01-30			—
Cemented joints.....:		☐ Yes	☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: Size of module 2.58 [m²]					

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

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-08/2024-03-19			—
Total cycles .....:		50			—
Applied current [A] .....:		14.10 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		80			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-03-19			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-03-19			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.58 [m²]					

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

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-29/2024-04-09		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-09		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-09		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-09		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		1935		—
Solution temperature [℃] .....:		23.5		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD].....:		2024-04-09		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] .....:		40		—
Applied force perpendicular to the mounting surface [N] .....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-09		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-09		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-09		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V] .....:		2 minutes of 2025		—
Solution resistivity [Ω cm] .....:		1937		—
Solution temperature [℃] .....:		23.7		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: 1. Size of module 2.58 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE D				
Sample #	4-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-17/2024-02-29		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2385		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-03-29		—
Mounting method ....:	Clamps mounting (8 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-01		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-01		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-01		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	1879		—
Solution temperature [℃] .... :	23.6		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

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

Supplementary information: Size of module 2.58 [m²]		
SEQUENCE E		
Sample #	N/A	—
Table 30: MST 51 - Thermal cycling test		N/A
SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	4-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-04-01	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle…….....:	1221 W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	52.3/48.4	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	D1: 156.2; F24: 112.5; E24: 95.1; C15: 165.9	—
Shading rate [%] or number of cells shaded.....:	D1: 39; F24: 35; E24: 33; C15: 29	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-04-01	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-04-01	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
13.49	51.72	12.89	44.15	569.0	81.56

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-04-01	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-04-01	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	1879	—
Solution temperature [℃] .....:	23.6	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	12		13	…	21	22	23	24
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 2.58 [m²]

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

Sample #	4-M13			—
Table 32: MST 21 - Temperature Test				P
Reference solar irradiance (W/m²) .....:	1000 W/m²			—
Reference ambient temperature (℃) .....:	40			—
Module at MPP				
Measuring location:	Component temperature T_{OBS} (℃)	Normalized temperature T_{CON} (℃)	Component temperature limit (℃)	—
PV module frontsheet above the centre cell	73.8	77.1	Glass	—
PV module backsheet below the centre cell	71.1	73.7	Glass	—
Terminal enclosure interior surface	70.2	72.8	110	P
Field wiring terminals	79.6	81.5	110	P
Insulation of the field wiring leads	71.2	73.6	110	P
External connector bodies	72.4	75.2	105	P
Bypass diode bodies	78.3	80.0	200	P
MST 01: Visual inspection after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-02-05			—
Findings ..... :	☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-02-05			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, DC) .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-02-05			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, dc) .....:	2 minutes of 1500			—
Solution resistivity (Ω cm) .....:	1811			—
Solution temperature (℃) .....:	22.8			—
Measured (MΩ)	Required (MΩ)			Result
>1000	>15.5			P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	4-M13			—
Table 34: MST 26 - Reverse current overload test				P
Test Date [YYYY-MM-DD] .....:		2024-04-01		—
Module over-current protection rating [A].....:		30		—
Test current [A].....:		40.5		—
Range of applied voltage [V] .....:		63.8/57.8		—
Test duration .....:		2 hours		—
Observations				Result
Maximum external module surface temperature during the test [℃] .....:		96.8		P
MST 01: Visual inspection after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-04-01		—
Findings..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-04-01		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-04-01		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm].....:		<3500		—
Solution temperature [℃] .....:		23.6		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G				
Sample #:	4-M14			—
Table 35.2: MST 14 - Impulse voltage test				P
Test Date [YYYY-MM-DD] .....:		2024-04-08		—
Maximum system voltage [V] .....:		*1500*		—
Required Impulse voltage [V].....:		*19680*		—
Measured Impulse voltage [V] .....:		*19680*		P
T_1 [µs].....:		*1.2*		P
T_2 [µs].....:		*50*		P
Thickness of conductive foil [mm] .....:		0.05		—
Results				—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)				P
MST 01: Visual inspection after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-04-08		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-04-08		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: This test is subcontracted to CPVT. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

OTHER TESTS		
Sample #:	4-fire 1, 4-fire 2, 4-fire 3	—
Table 36: MST 23 - Fire test		P
Test Date [YYYY-MM-DD] .....:	2024-04-02	—
Module fire resistance class (A, B, C) .....:	C	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to CPVT. Please refer to annex 3 for detailed pictures after test.		

Sample #:	4-M16		—
Table 37: MST 24 - Ignitability test			P
Test Date [YYYY-MM-DD].....:	2024-04-03		—
Flame application point.....:	-		—
Surface exposure.....:	☒ Yes	☐ No	—
Backsheet foil exposure.....:	☐ Yes	☒ No	—
Frame adhesive exposure .....:	☒ Yes	☐ No	—
Edge exposure.....:	☒ Yes	☐ No	—
Junction box adhesive exposure.....:	☒ Yes	☐ No	—
Type label exposure .....:	☐ Yes	☒ No	—
Backrail adhesive exposure.....:	☐ Yes	☒ No	—
Ignition occurs .....:	☐ Yes	☒ No	—
Flame spread less as 150 mm	☒ Yes	☐ No	P
Length of destroyed area.....:	N/A		P
Supplementary information: This test is subcontracted to CPVT.			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	4-M15	—
Table 38: MST 32 - Module breakage test		P
Test Date [YYYY-MM-DD] .....:	2024-03-01	—
Weight of impactor [kg] .....:	45.5	—
Thickness of sample [mm].....:	35	—
Mounting technique used.....:	Clamps mounting (8 points/long side with 2 beams across the module at the long sides)	—
Module breakage .....:	☒ No breakage	—
	☒ No separation from frame or mounting structure	—
	☐ Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
	☐ Breakage occurred, no particles larger than 65 cm ²ejected from sample	—
	☐ Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos		Result
No visual defects		P
Supplementary information: N/A		

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....: 2024-02-19 for 4-M1# 2024-04-01 for 4-M2-1#, 4-M2-2#, 4-M3#, 4-M12#, 4-M13# 2024-04-09 for 4-M4#						—
Module temperature [℃]....:			25			—
Irradiance [W/m²]....:			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
4-M1	13.476	51.586	12.871	43.691	562.36	80.89
4-M2-1	13.320	51.504	12.679	44.021	558.13	81.36
4-M2-2	13.090	50.094	12.579	42.123	529.84	80.80
4-M3	13.441	51.577	12.802	44.068	564.17	81.38
4-M4	13.473	51.379	12.890	43.398	559.39	80.81
4-M6	13.336	51.626	12.694	44.022	558.82	81.17
4-M12	13.488	51.721	12.888	44.147	568.95	81.56
4-M13	13.486	51.693	12.901	44.107	569.03	81.62
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-02-19 for 4-M1# 2024-04-01 for 4-M2-1#, 4-M2-2#, 4-M3#, 4-M12#, 4-M13# 2024-04-09 for 4-M4#	—
Sample # 4-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M2-1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M2-2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 4-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings								P
Test Date [YYYY-MM-DD].....:		2024-02-19 for 4-M1# 2024-04-01 for 4-M2-1#, 4-M2-2#, 4-M3#, 4-M12#, 4-M13# 2024-04-09 for 4-M4#						—
Sample #	Markings legible		Not easily removable		No curling			Result
4-M1	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		
4-M2-1	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
4-M2-2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
4-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
4-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
4-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
4-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
4-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
4-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
Supplementary information: N/A								

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD].....:		2024-02-19 for 4-M1# 2024-04-01 for 4-M2-1#, 4-M2-2#, 4-M3#, 4-M12#, 4-M13# 2024-04-09 for 4-M4#		—
Sample #	The black indicating tape is visible through the resulting cut.			Result
4-M1	☒ Yes	☐ No		
4-M2-1	☒ Yes	☐ No		P
4-M2-2	☒ Yes	☐ No		P
4-M3	☒ Yes	☐ No		P
4-M4	☒ Yes	☐ No		P
4-M6	☒ Yes	☐ No		P
4-M10	☒ Yes	☐ No		P
4-M12	☒ Yes	☐ No		P
4-M13	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:		2024-02-19 for 4-M1# 2024-04-01 for 4-M2-1#, 4-M2-2#, 4-M3#, 4-M12#, 4-M13# 2024-04-09 for 4-M4#		—
☐ **Method A**				—
Ambient temperature [℃].....:		N/A		—
Current flow applied [A].....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—
Sample #	IV curve after shading			Result
	Diode 1 working properly	Diode 2 working properly	Diode 3 working properly	
4-M1	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
4-M2-1	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
4-M2-2	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
4-M3	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
4-M4	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
4-M6	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
4-M10	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
4-M12	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
4-M13	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
Supplementary information: N/A				

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Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMND-72HD570 (BOM5)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-01-15	—
Sample # 5-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M2-1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M2-2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—

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Clause	Requirement + Test	Result - Remark	Verdict
Sample # 5-M16	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	5-M10						—
Test Date [YYYY-MM-DD] .....:	2024-01-22						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	13.75±3%						—
Rated V_{OC} including manufacturing tolerances..:	51.90±3%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	13.551	51.671	12.875	44.037	566.96	80.97	—
Rear	10.448	51.211	9.605	44.805	430.36	80.44	—
BNPI	14.955	51.873	14.196	44.080	625.77	80.66	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-01-22						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
5-M1	13.528	51.637	12.861	44.042	566.41	81.08	—
5-M2-1	13.525	51.720	12.844	44.085	566.23	80.95	—
5-M2-2	13.522	51.705	12.871	44.039	566.80	81.07	—
5-M3	13.522	51.708	12.841	44.083	566.07	80.96	—
5-M4	13.539	51.732	12.879	44.081	567.71	81.06	—
5-M6	13.502	51.756	12.849	44.040	565.84	80.97	—
5-M12	13.501	51.795	12.880	44.082	567.75	81.19	—
5-M13	13.522	51.584	12.837	44.038	565.33	81.05	—
5-M14	13.511	51.726	12.864	44.077	567.03	81.13	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-01-22		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
5-M1	>1000	>15.5	No breakdown	×	P
5-M2-1	>1000	>15.5	No breakdown	×	P
5-M2-2	>1000	>15.5	No breakdown	×	P
5-M3	>1000	>15.5	No breakdown	×	P
5-M4	>1000	>15.5	No breakdown	×	P
5-M6	>1000	>15.5	No breakdown	×	P
5-M10	>1000	>15.5	No breakdown	×	P
5-M12	>1000	>15.5	No breakdown	×	P
5-M13	>1000	>15.5	No breakdown	×	P
5-M14	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m^2]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-01-22	—
Cemented joints .....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		2276	—
Solution temperature [℃] .....:		22.7	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
5-M1	>1000	>15.5	P
5-M2-1	>1000	>15.5	P
5-M2-2	>1000	>15.5	P
5-M3	>1000	>15.5	P
5-M4	>1000	>15.5	P
5-M6	>1000	>15.5	P
5-M10	>1000	>15.5	P
5-M12	>1000	>15.5	P
5-M13	>1000	>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :	2024-01-22			—
Test Date **Final** examination [YYYY-MM-DD] ... :	2024-02-19 for 5-M1# 2024-04-11 for 5-M2-1#, 5-M2-2#, 5-M3#, 5-M4# 2024-03-21 for 5-M6#, 2024-03-01 for 5-M15# 2024-03-07 for 5-M18#, 5-M19#, 5-M20#, 5-M21#			—
Maximum over-current protection rating [A]..... :	30			—
Current applied [A] ..... :	75			—
Location of designated grounding point ..... :	The ground hole of one longer side			—
Location of second contacting point ..... :	A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side			—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
5-M1	Initial examination	A: 0.035 B: 0.027 C: 0.038	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 37			—
	Final examination	A: 0.032 B: 0.027 C: 0.033	A: 0.001 B: 0.001 C: 0.001	P
5-M2-1	Initial examination	A: 0.034 B: 0.041 C: 0.035	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 54, MST 52			—
	Final examination	A: 0.029 B: 0.022 C: 0.028	A: 0.001 B: 0.001 C: 0.001	P
5-M2-2	Initial examination	A: 0.024 B: 0.036 C: 0.028	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 54, MST 52			—
	Final examination	A: 0.041 B: 0.037 C: 0.031	A: 0.001 B: 0.001 C: 0.001	P
5-M3	Initial examination	A: 0.036 B: 0.028 C: 0.032	A: 0.001 B: 0.001 C: 0.001	P

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Clause	Requirement + Test	Result - Remark		Verdict
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52			—
	Final examination	A: 0.026 B: 0.033 C: 0.037	A: 0.001 B: 0.001 C: 0.001	P
5-M4	Initial examination	A: 0.035 B: 0.028 C: 0.039	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 54, MST 51, MST 52			—
	Final examination	A: 0.034 B: 0.037 C: 0.046	A: 0.001 B: 0.001 C: 0.001	P
5-M6	Initial examination	A: 0.026 B: 0.029 C: 0.035	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 34,			—
	Final examination	A: 0.033 B: 0.038 C: 0.031	A: 0.001 B: 0.001 C: 0.001	P
5-M15	Initial examination	A: 0.023 B: 0.033 C: 0.036	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 32			—
	Final examination	A: 0.032 B: 0.031 C: 0.027	A: 0.001 B: 0.001 C: 0.001	P
5-M18	Initial examination	A: 0.035 B: 0.037 C: 0.026	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.025 B: 0.034 C: 0.038	A: 0.001 B: 0.001 C: 0.001	P
5-M19	Initial examination	A: 0.034 B: 0.023 C: 0.042	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.032 B: 0.025 C: 0.038	A: 0.001 B: 0.001 C: 0.001	P
5-M20	Initial examination	A: 0.026 B: 0.033 C: 0.045	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.031 B: 0.036 C: 0.034	A: 0.001 B: 0.001 C: 0.001	P
5-M21	Initial examination	A: 0.121 B: 0.082 C: 0.078	A: 0.002 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.141 B: 0.152 C: 0.085	A: 0.002 B: 0.002 C: 0.001	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-01-22	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-02-19 for 5-M1# 2024-04-11 for 5-M2-1#, 5-M2-2#, 5-M3#, 5-M4# 2024-03-21 for 5-M6#	—
Sample #	Position in test sequence:		
5-M1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 37, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
5-M2-1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
5-M2-2	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
5-M3	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52, MST13		—
	Final examination, access?	☐ Yes ☒ No	P
5-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
5-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A				
Sample #	5-M1			—
Table 13: MST 37 - Materials creep test				P
Test Date [YYYY-MM-DD] start/end .....:		2004-02-20/2024-02-29		—
Duration [h] .....:		200		—
Applied temperature [℃] .....:		105 ± 5		—
MST 01: Visual inspection after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
Supplementary information: For clearance and creepage distances see table 1.				
MST 16: Insulation test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied (V, dc) .....:		2 minutes of 1500		—
Solution resistivity (Ω cm) .....:		2254		—
Solution temperature (℃).....:		22.4		—
Measured(MΩ)		Required (MΩ)		Result
>1000		>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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

SEQUENCE B					
Table 14: MST 53 - Damp heat test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-01-25/2024-02-06		—
Applied load [N] .....:			N/A		—
Duration [h] .....:			200		—
Sample #			—		—
5-M2-1			—		—
5-M2-2			—		—
MST 01: Visual inspection after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-02-06		—
Sample # 5-M2-1	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
Sample # 5-M2-2	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-02-06		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
5-M2-1	>1000	>15.5	No breakdown	×	P
5-M2-2	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

Table 15: MST 54 - UV test (front side)			P
Sample #	5-M2-1		—
Test Date [YYYY-MM-DD] start/end .....:		2024-03-01/2024-03-29	—
Module temperature [℃] .....:		60	—
Irradiation total [kWh/m²] .....:		60	—
Open circuits .....:		☐ Yes ☒ No	P
MST 01: Visual inspection after UV test			—
Test Date [YYYY-MM-DD].....:		2024-03-29	—

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

Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-03-29		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²] This test is conducted in compliance with IEC 61730-2:2023.				

Table 17: MST 54 - UV test (back side)				P
Sample #	5-M2-2			—
Test Date [YYYY-MM-DD] start/end ..... :		2024-03-01/2024-03-29		—
Module temperature [℃] ..... :		60		—
Irradiation total [kWh/m²] ..... :		60		—
Open circuits ..... :		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-03-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-03-29		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²] This test is conducted in compliance with IEC 61730-2:2023.				

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

Table18: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:			2023-04-01/2024-04-11		—
Total cycles .....:			10		—
Open circuits .....:			☐ Yes ☒ No		P
Sample #	—				—
5-M2-1	—				—
5-M2-2	—				—
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:			2024-04-11		—
Findings ..... :			☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos			No visual defects		—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:			2024-04-11		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
5-M2-1	>1000	>15.5	No breakdown	x	P
5-M2-2	>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test					—
Test Date [YYYY-MM-DD].....:			2024-04-11		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:			2 minutes of 1500		—
Solution resistivity [Ω cm) .....:			2235		—
Solution temperature [℃] .....:			23.1		—
Sample #	Measured (MΩ)		Required (MΩ)		Result
5-M2-1	>1000		>15.5		P
5-M2-2	>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]					

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

SEQUENCE B1				
Sample #	5-M3			—
Table 19: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-01/2024-02-03		—
Temperature [℃] Duration [h] .....:		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-03		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-03		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 20: MST 56 - Dry heat conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-06/2024-02-15		—
Temperature [℃] Duration [h] ..... :		105 ± 5 / 200		—
MST 01: Visual inspection after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-15		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-15		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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

Table21: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-15/2024-03-25			—
Total cycles ..... :		10			—
Open circuits ..... :		☐ Yes ☒ No			P
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-03-25			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-03-25			—
Cemented joints .....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: Size of module 2.58 [m²]					

Table 22: MST 55 - Cold conditioning					P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-26/2024-03-28			—
Temperature [℃] / Duration [h] ..... :		-40 / 48			—
MST 01: Visual inspection after Cold conditioning					—
Test Date [YYYY-MM-DD].....:		2024-03-28			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Cold conditioning					—
Test Date [YYYY-MM-DD].....:		2024-03-28			—
Cemented joints .....:		☐ Yes ☒ No			—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: Size of module 2.58 [m²]					

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

Table 23: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-01/2024-04-11		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-11		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-11		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-11		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2245		—
Solution temperature [℃] .....:		23.1		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

SEQUENCE C				
Sample #	5-M4			—
Table 24: MST 54 - UV test				P
Front side				
Test Date [YYYY-MM-DD] start/end .....:		2024-01-29/2024-02-05		—
Module temperature [℃] .....:		60.8		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
Back side (only for bifacial modules)				
Test Date [YYYY-MM-DD] start/end .....:		2024-02-17/2024-02-23		—
Module temperature [℃] .....:		61.4		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD].....:		2024-02-23		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD].....:		2024-02-23		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-08/2024-03-15			—
Total cycles .....:		50			—
Applied current [A] .....:		15.66 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		80			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-03-15			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-03-15			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.58 [m²]					

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

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-01/2024-04-11		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-11		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-11		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-11		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2235		—
Solution temperature [℃] .....:		22.6		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD].....:		2024-04-11		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] .....:		40		—
Applied force perpendicular to the mounting surface [N] .....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-11		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-11		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-11		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V] .....:		2 minutes of 2025		—
Solution resistivity [Ω cm] .....:		2175		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: 1. Size of module 2.58 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE D				
Sample #	5-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-02/2024-03-19		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-03-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-03-19		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-03-19		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2234		—
Solution temperature [℃] .....:		21.5		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-03-21		—
Mounting method ....:	Clamps mounting (8 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-21		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-21		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-21		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2166		—
Solution temperature [℃] .... :	21.7		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information: Size of module 2.58 [m²]		
SEQUENCE E		
Sample #	N/A	—
Table 30: MST 51 - Thermal cycling test		N/A
SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	5-M12				—
Table 33: MST 22 - Hot-spot endurance test					P
Test Date [YYYY-MM-DD] start/end .....:	2024-04-01				—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS				—
Irradiance during each cycle…….....:	1228 W/m²				—
Module temperature at thermal equilibrium in each cycle [℃] .....:	53.2/51.3				—
Determination of worst case cell					—
Maximum measured cell temperature in each cycle [℃] .....:	A7: 123.5; F10 148.6; F21: 156.5; D5: 132.4				—
Shading rate [%] or number of cells shaded.....:	A7: 20; F10: 20; F21: 15; D5: 15				—
Test hours for each cycle.....:	1				—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².					
MST 01: Visual inspection after hot-spot endurance test					—
Test Date [YYYY-MM-DD].....:	2024-04-02				—
Findings ..... :	☐ Yes ☒ No				P
Nature and position of findings – comments or attach photos	No visual defects				—
MST 02: Maximum power determination after hot-spot endurance test					—
Test Date [YYYY-MM-DD].....:	2024-04-02				—
Module temperature [℃] .....:	Corrected to 25.0				—
Irradiance [W/m²] .....:	Corrected to 1000				—
Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
13.521	51.719	12.831	44.105	565.93	80.93
MST 16: Insulation test after hot-spot endurance test					—
Test Date [YYYY-MM-DD].....:	2024-04-02				—
Cemented joints.....:	☐ Yes ☒ No				—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000				—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
MST 17: Wet leakage current test after hot-spot endurance test					—
Test Date [YYYY-MM-DD].....:	2024-04-02				—
Cemented joints.....:	☐ Yes ☒ No				—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	2165	—
Solution temperature [℃] .....:	21.6	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	12		13	…	21	22	23	24
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 2.58 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	5-M13			—
Table 32: MST 21 - Temperature Test				P
Reference solar irradiance (W/m²) .....:	1000 W/m²			—
Reference ambient temperature (℃) .....:	40			—
Module at MPP				
Measuring location:	Component temperature T_{OBS} (℃)	Normalized temperature T_{CON} (℃)	Component temperature limit (℃)	—
PV module frontsheet above the centre cell	73.5	75.0	Glass	—
PV module backsheet below the centre cell	72.6	74.1	Glass	—
Terminal enclosure interior surface	61.2	62.7	110	P
Field wiring terminals	58.3	59.8	110	P
Insulation of the field wiring leads	62.4	63.9	110	P
External connector bodies	57.6	59.1	105	P
Bypass diode bodies	53.4	54.9	200	P
MST 01: Visual inspection after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-03-05			—
Findings ..... :	☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-03-05			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, DC) .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-03-05			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, dc) .....:	2 minutes of 1500			—
Solution resistivity (Ω cm) .....:	2265			—
Solution temperature (℃) .....:	22.3			—
Measured (MΩ)		Required (MΩ)		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	5-M13			—
Table 34: MST 26 - Reverse current overload test				P
Test Date [YYYY-MM-DD] ..... :		2024-03-07		—
Module over-current protection rating [A]..... :		30		—
Test current [A]..... :		40.5		—
Range of applied voltage [V] ..... :		63.3/57.5		—
Test duration ..... :		2 hours		—
Observations				Result
Maximum external module surface temperature during the test [℃] ..... :		85.9		P
MST 01: Visual inspection after Reverse current overload test				—
Test Date [YYYY-MM-DD] ..... :		2024-03-07		—
Findings..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Reverse current overload test				—
Test Date [YYYY-MM-DD] ..... :		2024-03-07		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after Reverse current overload test				—
Test Date [YYYY-MM-DD] ..... :		2024-03-07		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc]..... :		2 minutes of 1500		—
Solution resistivity [Ω cm]..... :		2186		—
Solution temperature [℃] ..... :		22.7		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G				
Sample #:	5-M14			—
Table 35.2: MST 14 - Impulse voltage test				P
Test Date [YYYY-MM-DD] .....:		2024-04-05		—
Maximum system voltage [V] .....:		*1500*		—
Required Impulse voltage [V].....:		*19680*		—
Measured Impulse voltage [V] .....:		*19680*		P
T_1 [µs].....:		*1.2*		P
T_2 [µs].....:		*50*		P
Thickness of conductive foil [mm] .....:		0.05		—
Results				—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)				P
MST 01: Visual inspection after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-04-05		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-04-05		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: This test is subcontracted to CPVT. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

OTHER TESTS		
Sample #:	5-fire 1, 5-fire 2, 5-fire 3	—
Table 36: MST 23 - Fire test		P
Test Date [YYYY-MM-DD] .....:	2024-04-08	—
Module fire resistance class (A, B, C) .....:	C	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to CPVT. Please refer to annex 3 for detailed pictures after test.		

Sample #:	5-M16		—
Table 37: MST 24 - Ignitability test			P
Test Date [YYYY-MM-DD].....:	2024-04-07		—
Flame application point.....:	-		—
Surface exposure.....:	☒ Yes	☐ No	—
Backsheet foil exposure.....:	☐ Yes	☒ No	—
Frame adhesive exposure .....:	☒ Yes	☐ No	—
Edge exposure.....:	☒ Yes	☐ No	—
Junction box adhesive exposure.....:	☒ Yes	☐ No	—
Type label exposure .....:	☐ Yes	☒ No	—
Backrail adhesive exposure.....:	☐ Yes	☒ No	—
Ignition occurs .....:	☐ Yes	☒ No	—
Flame spread less as 150 mm	☒ Yes	☐ No	P
Length of destroyed area.....:	N/A		P
Supplementary information: This test is subcontracted to CPVT.			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	5-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:	2024-03-01		—
Weight of impactor [kg] .....:	45.5		—
Thickness of sample [mm].....:	30		—
Mounting technique used.....:	Clamps mounting (8 points on long side with 2 beams across the module at the long sides)		—
Module breakage .....:	☒	No breakage	—
	☒	No separation from frame or mounting structure	—
	☐	Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
	☐	Breakage occurred, no particles larger than 65 cm ²ejected from sample	—
	☐	Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....: 2024-02-19 for 5-M1# 2024-04-11 for 5-M2-1#, 5-M2-2#, 5-M3#, 5-M4# 2024-03-21 for 5-M6#, 2024-04-02 for 5-M12# 2024-03-07 for 5-M13#						—
Module temperature [℃]....:			25			—
Irradiance [W/m²]....:			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A)	Vmp [V]	Pmp [W]	FF [%]
5-M1	13.478	51.556	12.861	43.652	561.40	80.80
5-M2-1	13.241	50.251	12.632	42.434	536.02	80.56
5-M2-2	13.429	51.670	12.781	44.039	562.87	81.12
5-M3	13.449	51.647	12.793	44.020	563.16	81.08
5-M4	13.465	51.136	12.806	43.157	552.69	80.27
5-M6	13.389	51.486	12.783	43.725	558.94	81.08
5-M12	13.602	51.702	12.926	43.912	567.62	80.71
5-M13	13.478	51.556	12.861	43.652	561.40	80.80
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-02-19 for 5-M1# 2024-04-11 for 5-M2-1#, 5-M2-2#, 5-M3#, 5-M4# 2024-03-21 for 5-M6#, 2024-04-02 for 5-M12# 2024-03-07 for 5-M13#	—
Sample # 5-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M2-1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M2-2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 5-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings				P
Test Date [YYYY-MM-DD].....:		2024-02-19 for 5-M1# 2024-04-11 for 5-M2-1#, 5-M2-2#, 5-M3#, 5-M4# 2024-03-21 for 5-M6#, 2024-04-02 for 5-M12# 2024-03-07 for 5-M13#		—
Sample #	Markings legible	Not easily removable	No curling	Result
5-M1	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	
5-M2-1	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
5-M2-2	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
5-M3	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
5-M4	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
5-M6	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
5-M10	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
5-M12	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
5-M13	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
Supplementary information: N/A				

Table 45: MST 06 - Sharp edge test			P
Test Date [YYYY-MM-DD].....:		2024-02-19 for 5-M1# 2024-04-11 for 5-M2-1#, 5-M2-2#, 5-M3#, 5-M4# 2024-03-21 for 5-M6#, 2024-04-02 for 5-M12# 2024-03-07 for 5-M13#	—
Sample #	The black indicating tape is visible through the resulting cut.		Result
5-M1	☒ Yes ☐ No		
5-M2-1	☒ Yes ☐ No		P
5-M2-2	☒ Yes ☐ No		P
5-M3	☒ Yes ☐ No		P
5-M4	☒ Yes ☐ No		P
5-M6	☒ Yes ☐ No		P
5-M10	☒ Yes ☐ No		P
5-M12	☒ Yes ☐ No		P
5-M13	☒ Yes ☐ No		P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:		2024-02-19 for 5-M1# 2024-04-11 for 5-M2-1#, 5-M2-2#, 5-M3#, 5-M4# 2024-03-21 for 5-M6#, 2024-04-02 for 5-M12# 2024-03-07 for 5-M13#		—
☐ **Method A**				—
Ambient temperature [℃].....:		N/A		—
Current flow applied [A].....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
5-M1	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
5-M2-1	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
5-M2-2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
5-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
5-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
5-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
5-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
5-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
5-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

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Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMND-72HD570 (BOM6)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-01-10 for 6-M4#, 6-M6#, 6-M10#, 6-M12#, 6-M14#, 6-M15#, 6-M16#, 6-fire 1#, 6-fire 2#, 6-fire 3# 2024-03-22 for 6-M8#	—
Sample # 6-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M2-1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M2-2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—

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Clause	Requirement + Test	Result - Remark	Verdict
Sample # 6-M16	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	6-M10						—
Test Date [YYYY-MM-DD] .....:	2024-01-22						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	13.75±3%						—
Rated V_{OC} including manufacturing tolerances..:	51.90±3%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	13.48	51.52	15.51	43.67	563.8	81.18	—
Rear	10.53	51.14	9.78	44.13	431.6	80.15	—
BNPI	14.86	51.78	14.16	43.93	622.1	80.85	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-01-16 for 6-M1#, 6-M2-1#, 6-M2-2#, 6-M3#, 6-M6#, 6-M14# 2024-01-22 for 6-M4#; 2024-01-30 for 6-M12#; 2024-03-27 for 6-M8#						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
6-M1	13.50	51.68	15.51	43.78	565.2	81.01	—
6-M2-1	13.52	51.66	15.52	43.83	566.3	81.08	—
6-M2-2	13.50	51.70	12.89	43.89	565.7	81.05	—
6-M3	13.48	51.66	12.87	43.89	564.9	81.12	—
6-M4	13.47	51.58	12.87	43.77	563.3	81.08	—
6-M6	13.48	51.60	12.88	43.79	564.0	81.08	—
6-M8	13.47	51.62	12.87	43.82	563.9	81.10	—
6-M12	13.50	51.49	12.88	43.77	563.8	81.11	—
6-M14	13.52	51.68	15.50	43.86	565.8	80.98	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-01-16 for 6-M1#, 6-M2-1#, 6-M2-2#, 6-M3#,6-M6#, 6-M14# 2024-01-22 for 6-M4#; 2024-01-30 for 6-M12# 2024-03-27 for 6-M8#		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
6-M1	>1000	>15.5	No breakdown	×	P
6-M2-1	>1000	>15.5	No breakdown	×	P
6-M2-2	>1000	>15.5	No breakdown	×	P
6-M3	>1000	>15.5	No breakdown	×	P
6-M4	>1000	>15.5	No breakdown	×	P
6-M6	>1000	>15.5	No breakdown	×	P
6-M8	>1000	>15.5	No breakdown	×	P
6-M10	>1000	>15.5	No breakdown	×	P
6-M12	>1000	>15.5	No breakdown	×	P
6-M14	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-01-16 for 6-M1#, 6-M2-1#, 6-M2-2#, 6-M3#, 6-M6# 2024-01-22 for 6-M4#; 2024-01-30 for 6-M12#; 2024-03-27 for 6-M8#	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		22.3 for 6-M1#, 6-M2-1#, 6-M2-2#, 6-M3#, 6-M6#; 22.5 for 6-M4#; 22.2 for 6-M12#; 22.6 for 6-M8#	—
Solution temperature [℃] .....:		2317 for 6-M1#, 6-M2-1#, 6-M2-2#, 6-M3#, 6-M6#; 2252 for 6-M4#; 2236 for 6-M12#; 2219 for 6-M8#	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
6-M1	>1000	>15.5	P
6-M2-1	>1000	>15.5	P
6-M2-2	>1000	>15.5	P
6-M3	>1000	>15.5	P
6-M4	>1000	>15.5	P
6-M6	>1000	>15.5	P
6-M8	>1000	>15.5	P
6-M10	>1000	>15.5	P
6-M12	>1000	>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :		2024-01-16 for 6-M1#, 6-M2-1#, 6-M2-2#, 6-M3#, 6-M6#, 6-M15# 2024-01-22 for 6-M4# 2024-01-30 for 6-M18#, 6-M19#, 6-M20#, 6-M21# 2024-03-27 for 6-M8#		—
Test Date **Final** examination [YYYY-MM-DD] ... :		2024-01-26 for 6-M1# 2024-03-06 for 6-M2-1#, 6-M2-2#, 6-M3#, 6-M6# 2024-03-08 for 6-M4# 2024-02-05 for 6-M18#, 6-M19#, 6-M20#, 6-M21# 2024-01-25 for 6-M15# 2024-05-08 for 6-M8#		—
Maximum over-current protection rating [A]..... :		30		—
Current applied [A] ..... :		75		—
Location of designated grounding point ..... :		The ground hole of one longer side		—
Location of second contacting point ..... :		A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side		—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
6-M1	Initial examination	A: 0.079 B: 0.075 C: 0.081	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 37			—
	Final examination	A: 0.085 B: 0.084 C: 0.800	A: 0.001 B: 0.001 C: 0.001	P
6-M2-1	Initial examination	A: 0.079 B: 0.083 C: 0.081	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 54, MST 52			—
	Final examination	A: 0.082 B: 0.079 C: 0.083	A: 0.001 B: 0.001 C: 0.001	P
6-M2-2	Initial examination	A: 0.084 B: 0.082 C: 0.079	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 54, MST 52			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.083 B: 0.159 C: 0.157	A: 0.001 B: 0.002 C: 0.002	P
6-M3	Initial examination	A: 0.082 B: 0.084 C: 0.079	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52			—
	Final examination	A: 0.157 B: 0.305 C: 0.230	A: 0.002 B: 0.004 C: 0.003	P
6-M4	Initial examination	A: 0.157 B: 0.153 C: 0.079	A: 0.002 B: 0.002 C: 0.001	P
	Preconditioning: MST 54, MST 51, MST 52			—
	Final examination	A: 0.228 B: 0.304 C: 0.381	A: 0.003 B: 0.004 C: 0.005	P
6-M6	Initial examination	A: 0.156 B: 0.078 C: 0.081	A: 0.002 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 34			—
	Final examination	A: 0.308 B: 0.379 C: 0.305	A: 0.004 B: 0.005 C: 0.004	P
6-M8	Initial examination	A: 0.079 B: 0.077 C: 0.080	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 51			—
	Final examination	A: 0.154 B: 0.231 C: 0.308	A: 0.002 B: 0.003 C: 0.004	P
6-M15	Initial examination	A: 0.153 B: 0.072 C: 0.081	A: 0.002 B: 0.001 C: 0.001	P
	Preconditioning: MST 32			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.310 B: 0.379 C: 0.302	A: 0.004 B: 0.005 C: 0.004	P
6-M18	Initial examination	A: 0.078 B: 0.081 C: 0.079	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.229 B: 0.157 C: 0.153	A: 0.003 B: 0.002 C: 0.002	P
6-M19	Initial examination	A: 0.079 B: 0.081 C: 0.083	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.079 B: 0.082 C: 0.083	A: 0.001 B: 0.001 C: 0.001	P
6-M20	Initial examination	A: 0.079 B: 0.081 C: 0.078	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.158 B: 0.227 C: 0.156	A: 0.002 B: 0.003 C: 0.002	P
6-M21	Initial examination	A: 0.082 B: 0.079 C: 0.081	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.151 B: 0.154 C: 0.079	A: 0.002 B: 0.002 C: 0.001	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-01-16 for 6-M1#, 6-M2-1#, 6-M2-2#, 6-M3#, 6-M6# 2024-01-22 for 6-M4# 2024-03-27 for 6-M8#	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-01-26 for 6-M1# 2024-03-06 for 6-M2-1#, 6-M2-2#, 6-M3#, 6-M6# 2024-03-08 for 6-M4# 2024-05-08 for 6-M8#	—
Sample #	Position in test sequence:		
6-M1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 37, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
6-M2-1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
6-M2-2	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
6-M3	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52, MST13		—
	Final examination, access?	☐ Yes ☒ No	P
6-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
6-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
6-M8	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 51, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A				
Sample #	6-M1			—
Table 13: MST 37 - Materials creep test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-17/2024-01-26		—
Duration [h] .....:		200		—
Applied temperature [℃] .....:		105 ± 5		—
MST 01: Visual inspection after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-01-26		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
Supplementary information: For clearance and creepage distances see table 1.				
MST 16: Insulation test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-01-26		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-01-26		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied (V, dc) .....:		2 minutes of 1500		—
Solution resistivity (Ω cm) .....:		2287		—
Solution temperature (℃).....:		22.0		—
Measured(MΩ)		Required (MΩ)		Result
>1000		>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B					
Table 14: MST 53 - Damp heat test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-01-19/2024-01-28		—
Applied load [N] .....:			N/A		—
Duration [h] .....:			200		—
Sample #	—				—
6-M2-1	—				—
6-M2-2	—				—
MST 01: Visual inspection after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-01-28		—
Sample # 6-M2-1	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
Sample # 6-M2-2	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-01-28		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
6-M2-1	>1000	>15.5	No breakdown	×	P
6-M2-2	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

Table 15: MST 54 - UV test (front side)			P
Sample #	6-M2-1		—
Test Date [YYYY-MM-DD] start/end .....:		2024-02-05/2024-02-19	—
Module temperature [℃] .....:		63.0	—
Irradiation total [kWh/m²] .....:		60.0	—
Open circuits .....:		☐ Yes ☒ No	P
MST 01: Visual inspection after UV test			—
Test Date [YYYY-MM-DD].....:		2024-02-19	—

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Clause	Requirement + Test	Result - Remark	Verdict

Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-19		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²] This test is conducted in compliance with IEC 61730-2:2023.				

Table 17: MST 54 - UV test (back side)				P
Sample #	6-M2-2			—
Test Date [YYYY-MM-DD] start/end ..... :		2024-02-05/2024-02-19		—
Module temperature [℃] ..... :		60		—
Irradiation total [kWh/m²] ..... :		60		—
Open circuits ..... :		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-19		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²] This test is conducted in compliance with IEC 61730-2:2023.				

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Clause	Requirement + Test	Result - Remark	Verdict

Table18: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-02-19/2024-02-29		—
Total cycles .....:			10		—
Open circuits .....:			☐ Yes ☒ No		P
Sample #	—				—
6-M2-1	—				—
6-M2-2	—				—
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:			2024-02-29		—
Findings ..... :			☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos			No visual defects		—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:			2024-02-29		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
6-M2-1	>1000	>15.5	No breakdown	x	P
6-M2-2	>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test					—
Test Date [YYYY-MM-DD].....:			2024-02-29		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:			2 minutes of 1500		—
Solution resistivity [Ω cm) .....:			2410		—
Solution temperature [℃] .....:			22.9		—
Sample #	Measured (MΩ)		Required (MΩ)		Result
6-M2-1	>1000		>15.5		P
6-M2-2	>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B1				
Sample #	6-M3			—
Table 19: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-17/2024-01-19		—
Temperature [℃] Duration [h] .....:		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-19		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 20: MST 56 - Dry heat conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-19/2024-01-29		—
Temperature [℃] Duration [h] ..... :		105 ±5 / 200		—
MST 01: Visual inspection after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ±5) ℃ is applied, higher than the required (90 ±3) ℃. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table21: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-30/2024-02-09		—
Total cycles ..... :		10		—
Open circuits ..... :		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-09		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-09		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 22: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-17/2024-02-19		—
Temperature [℃] / Duration [h] ..... :		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-19		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 23: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-19/2024-02-29		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2405		—
Solution temperature [℃] .....:		22.1		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE C				
Sample #	6-M4			—
Table 24: MST 54 - UV test				P
Front side				—
Test Date [YYYY-MM-DD] start/end .....:		2024-01-23/2024-01-27		—
Module temperature [℃] .....:		63.2		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
Back side (only for bifacial modules)				—
Test Date [YYYY-MM-DD] start/end .....:		2024-01-29/2024-02-02		—
Module temperature [℃] .....:		61.7		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD].....:		2024-02-02		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD].....:		2024-02-02		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-08/2024-02-18			—
Total cycles .....:		50			—
Applied current [A] .....:		15.73 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		80			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-02-18			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-02-18			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-20/2024-03-01		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2305		—
Solution temperature [℃] .....:		22.2		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD].....:		2024-03-02		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] .....:		40		—
Applied force perpendicular to the mounting surface [N] .....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-03-02		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-03-02		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-03-02		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V] .....:		2 minutes of 2025		—
Solution resistivity [Ω cm] .....:		2467		—
Solution temperature [℃] .....:		22.5		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: 1. Size of module 2.58 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE D				
Sample #	6-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-17/2024-02-29		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2381		—
Solution temperature [℃] .....:		22.6		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-03-04		—
Mounting method ....:	Clamps mounting (4 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-04		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-04		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-04		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2275		—
Solution temperature [℃] .... :	21.5		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

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

Supplementary information: Size of module 2.58 [m²]

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

SEQUENCE E				
Sample #	6-M8			—
Table 30: MST 51 - Thermal cycling test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-29/2024-05-06		—
Total cycles .....:		200		—
Applied current [A] .....:		15.83 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages		—
Applied load [N] .....:		5		—
Limiting voltage [V] .....:		80		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2380		—
Solution temperature [℃] .....:		22.9		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.58 [m²]				

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

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	6-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-02-05/2024-02-06	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle…….....:	1230 W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	60.9/59.7	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	A12:128.9; D8:117.5; E20:130.5; B2:125.2;	—
Shading rate [%] or number of cells shaded.....:	A12:30; D8:25; E20:35; B2:30;	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-06	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-06	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
13.46	51.43	12.85	43.70	561.5	81.11

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-06	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-06	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	2287	—
Solution temperature [℃] .....:	22.5	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	12		13	…	21	22	23	24
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 2.58 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	N/A	—
Table 32: MST 21 - Temperature Test		N/A

Sample #	N/A	—
Table 34: MST 26 - Reverse current overload test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G				
Sample #:	6-M14			—
Table 35.2: MST 14 - Impulse voltage test				P
Test Date [YYYY-MM-DD] .....:		2024-01-25		—
Maximum system voltage [V] .....:		*1500*		—
Required Impulse voltage [V].....:		*19680*		—
Measured Impulse voltage [V] .....:		*19680*		P
T_1 [µs].....:		*1.2*		P
T_2 [µs].....:		*50*		P
Thickness of conductive foil [mm] .....:		0.05		—
Results				—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)				P
MST 01: Visual inspection after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-01-25		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-01-25		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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

OTHER TESTS		
Sample #:	6-fire 1, 6-fire 2, 6-fire 3	—
Table 36: MST 23 - Fire test		P
Test Date [YYYY-MM-DD] .....:	2024-01-16	—
Module fire resistance class (A, B, C) .....:	C	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to Zhejiang Gather Uni. Please refer to annex 3 for detailed pictures after test.		

Sample #:	6-M16		—
Table 37: MST 24 - Ignitability test			P
Test Date [YYYY-MM-DD].....:	2024-01-25		—
Flame application point.....:	-		—
Surface exposure.....:	☒ Yes	☐ No	—
Backsheet foil exposure.....:	☐ Yes	☒ No	—
Frame adhesive exposure .....:	☒ Yes	☐ No	—
Edge exposure.....:	☒ Yes	☐ No	—
Junction box adhesive exposure.....:	☒ Yes	☐ No	—
Type label exposure .....:	☐ Yes	☒ No	—
Backrail adhesive exposure.....:	☐ Yes	☒ No	—
Ignition occurs .....:	☐ Yes	☒ No	—
Flame spread less as 150 mm	☒ Yes	☐ No	P
Length of destroyed area.....:	N/A		P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	6-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:	2024-01-25		—
Weight of impactor [kg] .....:	45.5		—
Thickness of sample [mm].....:	35		—
Mounting technique used.....:	Clamps mounting (4 points on long side with 2 beams across the module at the long sides)		—
Module breakage .....:	☒	No breakage	—
	☒	No separation from frame or mounting structure	—
	☐	Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
	☐	Breakage occurred, no particles larger than 65 cm ²ejected from sample	—
	☐	Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....::			2024-03-06 for 6-M2-1#, 6-M2-2#, 6-M3# 2024-03-08 for 6-M4#, 6-M6#; 2024-02-08 for 6-M12# 2024-05-08 for 6-M8#			—
Module temperature [℃]....::			25			—
Irradiance [W/m²]....::			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
6-M2-1	13.30	51.42	12.69	43.59	553.2	80.89
6-M2-2	13.35	51.38	12.72	43.56	554.1	80.78
6-M3	13.29	50.98	12.67	43.22	547.6	80.82
6-M4	13.25	50.86	12.66	43.06	545.2	80.90
6-M6	13.25	51.21	12.66	43.40	549.5	80.98
6-M8	13.37	51.41	12.76	43.60	556.3	80.94
6-M12	13.44	51.35	12.81	43.65	559.1	81.01
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD]....:		2024-03-06 for 6-M2-1#, 6-M2-2#, 6-M3# 2024-03-08 for 6-M4#, 6-M6# 2024-02-08 for 6-M12# 2024-05-08 for 6-M8#, 6-M10#	—
Sample # 6-M2-1	Findings ....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M2-2	Findings ....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M3	Findings ....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M4	Findings ....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M6	Findings ....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M8	Findings ....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M10	Findings ....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 6-M12	Findings ....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings							P
Test Date [YYYY-MM-DD].....:		2024-03-06 for 6-M2-1#, 6-M2-2#, 6-M3# 2024-03-08 for 6-M4#, 6-M6# 2024-02-08 for 6-M12# 2024-05-08 for 6-M8#, 6-M10#					—
Sample #	Markings legible		Not easily removable		No curling		Result
6-M2-1	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M2-2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD].....:		2024-03-06 for 6-M2-1#, 6-M2-2#, 6-M3# 2024-03-08 for 6-M4#, 6-M6# 2024-02-08 for 6-M12# 2024-05-08 for 6-M8#, 6-M10#		—
Sample #	The black indicating tape is visible through the resulting cut.			Result
6-M2-1	☒ Yes	☐ No		
6-M2-2	☒ Yes	☐ No		P
6-M3	☒ Yes	☐ No		P
6-M4	☒ Yes	☐ No		P
6-M6	☒ Yes	☐ No		P
6-M8	☒ Yes	☐ No		P
6-M10	☒ Yes	☐ No		P
6-M12	☒ Yes	☐ No		P
6-M13	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:		2024-03-06 for 6-M2-1#, 6-M2-2#, 6-M3# 2024-03-08 for 6-M4#, 6-M6# 2024-02-08 for 6-M12# 2024-05-08 for 6-M8#, 6-M10#		—
☐ **Method A**				—
Ambient temperature [℃].....:		N/A		—
Current flow applied [A].....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
6-M2-1	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M2-2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
6-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMND-72HD570 (BOM7)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-01-10 for 7-M4#, 7-M6#, 7-M10#, 7-M12#, 7-M14#, 7-M15#, 7-M16#, 7-fire 1#, 7-fire 2#, 7-fire 3#; 2024-03-22 for 7-M8#	—
Sample # 7-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M2-1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M2-2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—

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Clause	Requirement + Test	Result - Remark	Verdict
Sample # 7-M16	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	7-M10						—
Test Date [YYYY-MM-DD] .....:	2024-01-16						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	13.75±3%						—
Rated V_{OC} including manufacturing tolerances..:	51.90±3%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	13.47	51.48	15.50	43.67	563.3	81.23	—
Rear	10.63	51.14	9.78	44.17	432.0	79.47	—
BNPI	14.89	51.75	14.15	43.94	621.7	80.68	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-01-16 for 7-M1#, 7-M2-1#, 7-M2-2#, 7-M3#, 7-M6#, 7-M14#; 2024-01-22 for 7-M4#, 2024-01-30 for 7-M12#; 2024-03-27 for 7-M8#						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
7-M1	13.50	51.65	12.89	43.89	565.8	81.14	—
7-M2-1	13.49	51.68	15.50	43.88	566.1	81.20	—
7-M2-2	13.50	51.63	12.88	43.89	565.3	81.10	—
7-M3	13.48	51.64	15.52	43.86	566.7	81.41	—
7-M4	13.49	51.57	15.50	43.77	564.8	81.19	—
7-M6	13.51	51.56	15.52	43.72	564.9	81.10	—
7-M8	13.50	51.60	12.89	43.78	564.3	81.01	—
7-M12	13.54	51.62	15.50	43.78	564.7	80.79	—
7-M14	13.51	51.64	15.51	43.84	566.0	81.13	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-01-16 for 7-M1#, 7-M2-1#, 7-M2-2#, 7-M3#, 7-M6#, 7-M14#; 2024-01-22 for 7-M4#; 2024-01-30 for 7-M12#; 2024-03-27 for 7-M8#		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
7-M1	>1000	>15.5	No breakdown	×	P
7-M2-1	>1000	>15.5	No breakdown	×	P
7-M2-2	>1000	>15.5	No breakdown	×	P
7-M3	>1000	>15.5	No breakdown	×	P
7-M4	>1000	>15.5	No breakdown	×	P
7-M6	>1000	>15.5	No breakdown	×	P
7-M8	>1000	>15.5	No breakdown	×	P
7-M10	>1000	>15.5	No breakdown	×	P
7-M12	>1000	>15.5	No breakdown	×	P
7-M14	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-01-16 for 7-M1#, 7-M2-1#, 7-M2-2#, 7-M3#, 7-M6# 2024-01-22 for 7-M4#; 2024-01-30 for 7-M12#; 2024-03-27 for 7-M8#	—
Cemented joints .....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		22.3 for 7-M1#, 7-M2-1#, 7-M2-2#, 7-M3#, 7-M6# 22.5 for 7-M4#; 22.2 for 7-M12#; 22.6 for 7-M8#	—
Solution temperature [℃] .....:		2317 for 7-M1#, 7-M2-1#, 7-M2-2#, 7-M3#, 7-M6# 2252 for 7-M4#; 2236 for 7-M12#; 2219 for 7-M8#	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
7-M1	>1000	>15.5	P
7-M2-1	>1000	>15.5	P
7-M2-2	>1000	>15.5	P
7-M3	>1000	>15.5	P
7-M4	>1000	>15.5	P
7-M6	>1000	>15.5	P
7-M8	>1000	>15.5	P
7-M10	>1000	>15.5	P
7-M12	>1000	>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :		2024-01-16 for 7-M1#, 7-M2-1#, 7-M2-2#, 7-M3#, 7-M6#, 7-M15# 2024-01-22 for 7-M4# 2024-01-30 for 7-M18#, 7-M19#, 7-M20#, 7-M21# 2024-03-27 for 7-M8#		—
Test Date **Final** examination [YYYY-MM-DD] ... :		2024-01-26 for 7-M1# 2024-03-06 for 7-M2-1#, 7-M2-2#, 7-M3#, 7-M6# 2024-03-08 for 7-M4# 2024-02-05 for 7-M18#, 7-M19#, 7-M20#, 7-M21# 2024-01-25 for 7-M15# 2024-05-08 for 7-M8#		—
Maximum over-current protection rating [A]..... :		30		—
Current applied [A] ..... :		75		—
Location of designated grounding point ..... :		The ground hole of one longer side		—
Location of second contacting point ..... :		A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side		—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
7-M1	Initial examination	A: 0.229 B: 0.079 C: 0.080	A: 0.003 B: 0.001 C: 0.001	P
	Preconditioning: MST 37			—
	Final examination	A: 0.379 B: 0.228 C: 0.079	A: 0.005 B: 0.003 C: 0.001	P
7-M2-1	Initial examination	A: 0.278 B: 0.081 C: 0.079	A: 0.003 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 54, MST 52			—
	Final examination	A: 0.303 B: 0.079 C: 0.080	A: 0.004 B: 0.001 C: 0.001	P
7-M2-2	Initial examination	A: 0.278 B: 0.079 C: 0.080	A: 0.003 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 54, MST 52			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.228 B: 0.153 C: 0.152	A: 0.004 B: 0.002 C: 0.002	P
7-M3	Initial examination	A: 0.153 B: 0.155 C: 0.079	A: 0.002 B: 0.002 C: 0.001	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52			—
	Final examination	A: 0.379 B: 0.078 C: 0.080	A: 0.004 B: 0.001 C: 0.001	P
7-M4	Initial examination	A: 0.303 B: 0.227 C: 0.079	A: 0.004 B: 0.003 C: 0.001	P
	Preconditioning: MST 54, MST 51, MST 52			—
	Final examination	A: 0.375 B: 0.305 C: 0.154	A: 0.005 B: 0.004 C: 0.002	P
7-M6	Initial examination	A: 0.302 B: 0.076 C: 0.079	A: 0.004 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 34			—
	Final examination	A: 0.378 B: 0.153 C: 0.155	A: 0.005 B: 0.002 C: 0.002	P
7-M8	Initial examination	A: 0.154 B: 0.156 C: 0.233	A: 0.002 B: 0.002 C: 0.003	P
	Preconditioning: MST 51			—
	Final examination	A: 0.310 B: 0.530 C: 0.459	A: 0.004 B: 0.007 C: 0.006	P
7-M15	Initial examination	A: 0.172 B: 0.090 C: 0.092	A: 0.002 B: 0.001 C: 0.001	P
	Preconditioning: MST 32			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.250 B: 0.131 C: 0.081	A: 0.004 B: 0.002 C: 0.001	P
7-M18	Initial examination	A: 0.135 B: 0.078 C: 0.080	A: 0.002 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.232 B: 0.152 C: 0.149	A: 0.003 B: 0.002 C: 0.002	P
7-M19	Initial examination	A: 0.090 B: 0.081 C: 0.079	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.160 B: 0.090 C: 0.095	A: 0.002 B: 0.001 C: 0.001	P
7-M20	Initial examination	A: 0.200 B: 0.135 C: 0.102	A: 0.003 B: 0.002 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.158 B: 0.221 C: 0.154	A: 0.002 B: 0.003 C: 0.002	P
7-M21	Initial examination	A: 0.121 B: 0.082 C: 0.078	A: 0.002 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.141 B: 0.152 C: 0.085	A: 0.002 B: 0.002 C: 0.001	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-01-16 for 7-M1#, 7-M2-1#, 7-M2-2#, 7-M3#, 7-M6# 2024-01-22 for 7-M4# 2024-03-27 for 7-M8#	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-01-26 for 7-M1# 2024-03-06 for 7-M2-1#,7-M2-2#,7-M3#, 7-M6# 2024-03-08 for 7-M4# 2024-05-08 for 7-M8#	—
Sample #	Position in test sequence:		
7-M1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 37, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
7-M2-1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
7-M2-2	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
7-M3	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52, MST13		—
	Final examination, access?	☐ Yes ☒ No	P
7-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
7-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
7-M8	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 51, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A				
Sample #	7-M1			—
Table 13: MST 37 - Materials creep test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-17/2024-01-26		—
Duration [h] .....:		200		—
Applied temperature [℃] .....:		105 ± 5		—
MST 01: Visual inspection after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-01-26		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
Supplementary information: For clearance and creepage distances see table 1.				
MST 16: Insulation test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-01-26		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-01-26		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied (V, dc) .....:		2 minutes of 1500		—
Solution resistivity (Ω cm) .....:		2287		—
Solution temperature (℃).....:		22.0		—
Measured(MΩ)		Required (MΩ)		Result
>1000		>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B					
Table 14: MST 53 - Damp heat test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-01-19/2024-01-28		—
Applied load [N] .....:			N/A		—
Duration [h] .....:			200		—
Sample #			—		—
7-M2-1			—		—
7-M2-2			—		—
MST 01: Visual inspection after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-01-28		—
Sample # 7-M2-1	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
Sample # 7-M2-2	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-01-28		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
7-M2-1	>1000	>15.5	No breakdown	×	P
7-M2-2	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

Table 15: MST 54 - UV test (front side)			P
Sample #	7-M2-1		—
Test Date [YYYY-MM-DD] start/end .....:		2024-02-05/2024-02-19	—
Module temperature [℃] .....:		63.0	—
Irradiation total [kWh/m²] .....:		60.0	—
Open circuits .....:		☐ Yes ☒ No	P
MST 01: Visual inspection after UV test			—
Test Date [YYYY-MM-DD].....:		2024-02-19	—

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Clause	Requirement + Test	Result - Remark	Verdict

Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-19		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²] This test is conducted in compliance with IEC 61730-2:2023.				

Table 17: MST 54 - UV test (back side)				P
Sample #	7-M2-2			—
Test Date [YYYY-MM-DD] start/end ..... :		2024-02-05/2024-02-19		—
Module temperature [℃] ..... :		60		—
Irradiation total [kWh/m²] ..... :		60		—
Open circuits ..... :		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-19		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²] This test is conducted in compliance with IEC 61730-2:2023.				

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Clause	Requirement + Test	Result - Remark	Verdict

Table18: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-02-19/2024-02-29		—
Total cycles .....:			10		—
Open circuits .....:			☐ Yes ☒ No		P
Sample #	—				—
7-M2-1	—				—
7-M2-2	—				—
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:			2024-02-29		—
Findings ..... :			☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos			No visual defects		—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:			2024-02-29		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
7-M2-1	>1000	>15.5	No breakdown	x	P
7-M2-2	>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test					—
Test Date [YYYY-MM-DD].....:			2024-02-29		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:			2 minutes of 1500		—
Solution resistivity [Ω cm) .....:			2410		—
Solution temperature [℃] .....:			22.9		—
Sample #	Measured (MΩ)		Required (MΩ)		Result
7-M2-1	>1000		>15.5		P
7-M2-2	>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B1				
Sample #	7-M3			—
Table 19: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-17/2024-01-19		—
Temperature [℃] Duration [h] .....:		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-19		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 20: MST 56 - Dry heat conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-19/2024-01-29		—
Temperature [℃] Duration [h] ..... :		105 ±5 / 200		—
MST 01: Visual inspection after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ±5) ℃ is applied, higher than the required (90 ±3) ℃. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table21: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-30/2024-02-09		—
Total cycles ..... :		10		—
Open circuits ..... :		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-09		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-09		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 22: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-17/2024-02-19		—
Temperature [℃] / Duration [h] ..... :		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-19		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 23: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-19/2024-02-29		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2405		—
Solution temperature [℃] .....:		22.1		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE C				
Sample #	7-M4			—
Table 24: MST 54 - UV test				P
Front side				—
Test Date [YYYY-MM-DD] start/end .....:		2024-01-23/2024-01-27		—
Module temperature [℃] .....:		62.8		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
Back side (only for bifacial modules)				—
Test Date [YYYY-MM-DD] start/end .....:		2024-01-29/2024-02-02		—
Module temperature [℃] .....:		61.7		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD].....:		2024-02-02		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD].....:		2024-02-02		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-08/2024-02-18			—
Total cycles .....:		50			—
Applied current [A] .....:		15.74 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		80			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-02-18			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-02-18			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance BSI. Size of module 2.58 [m²]					

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

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-20/2024-03-01		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2305		—
Solution temperature [℃] .....:		22.2		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD].....:		2024-03-02		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] .....:		40		—
Applied force perpendicular to the mounting surface [N] .....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-03-02		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-03-02		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-03-02		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V] .....:		2 minutes of 2025		—
Solution resistivity [Ω cm] .....:		2467		—
Solution temperature [℃] .....:		22.5		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: 1. Size of module 2.58 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE D				
Sample #	7-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-17/2024-02-29		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2381		—
Solution temperature [℃] .....:		22.6		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-03-03		—
Mounting method ....:	Clamps mounting (4 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-03		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-03		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-03		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2455		—
Solution temperature [℃] .... :	22.8		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

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

Supplementary information: Size of module 2.58 [m²]

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

SEQUENCE E				
Sample #	7-M8			—
Table 30: MST 51 - Thermal cycling test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-29/2024-05-06		—
Total cycles .....:		200		—
Applied current [A] .....:		15.87 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages		—
Applied load [N] .....:		5		—
Limiting voltage [V] .....:		80		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2380		—
Solution temperature [℃] .....:		22.9		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	7-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-02-05/2024-02-06	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle……......:	1232 W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	60.9/59.8	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	F13: 124.7; D5: 123.0; E23: 119.8; A21: 121.5	—
Shading rate [%] or number of cells shaded.....:	F13: 35; D5: 45; E23: 30; A21: 35	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-06	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-06	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
13.51	51.50	12.86	43.67	561.6	80.72

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-06	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-06	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	2432	—
Solution temperature [℃] .....:	22.4	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	12		13	…	21	22	23	24
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 2.58 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	N/A	—
Table 32: MST 21 - Temperature Test		N/A

Sample #	N/A	—
Table 34: MST 26 - Reverse current overload test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G			
Sample #:	7-M14		—
Table 35.2: MST 14 - Impulse voltage test			P
Test Date [YYYY-MM-DD] .....:		2024-01-25	—
Maximum system voltage [V] .....:		*1500*	—
Required Impulse voltage [V].....:		*19680*	—
Measured Impulse voltage [V] .....:		*19680*	P
T_1 [µs].....:		*1.2*	P
T_2 [µs].....:		*50*	P
Thickness of conductive foil [mm] .....:		0.05	—
Results			—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)			P
MST 01: Visual inspection after Impulse voltage test			—
Test Date [YYYY-MM-DD].....:		2024-01-25	—
Findings ..... :		☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos		No visual defects	—
MST 16: Insulation test after Impulse voltage test			—
Test Date [YYYY-MM-DD].....:		2024-01-25	—
Cemented joints..... :		☐ Yes ☒ No	—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000	—
Measured	Required	Dielectric breakdown	Result
MΩ	MΩ	Yes (description) / No	
>1000	>15.5	No breakdown / x	P
Supplementary information: Size of module 2.58 [m²]			

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

OTHER TESTS		
Sample #:	7-fire 1, 7-fire 2, 7-fire 3	—
Table 36: MST 23 - Fire test		P
Test Date [YYYY-MM-DD] .....:	2024-01-16	—
Module fire resistance class (A, B, C) .....:	C	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to Zhejiang Gather Uni. Please refer to annex 3 for detailed pictures after test.		

Sample #:	7-M16		—
Table 37: MST 24 - Ignitability test			P
Test Date [YYYY-MM-DD].....:	2024-01-25		—
Flame application point.....:	-		—
Surface exposure.....:	☒ Yes	☐ No	—
Backsheet foil exposure.....:	☐ Yes	☒ No	—
Frame adhesive exposure .....:	☒ Yes	☐ No	—
Edge exposure.....:	☒ Yes	☐ No	—
Junction box adhesive exposure.....:	☒ Yes	☐ No	—
Type label exposure .....:	☐ Yes	☒ No	—
Backrail adhesive exposure.....:	☐ Yes	☒ No	—
Ignition occurs .....:	☐ Yes	☒ No	—
Flame spread less as 150 mm	☒ Yes	☐ No	P
Length of destroyed area.....:	N/A		P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	7-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:		2024-01-25	—
Weight of impactor [kg] .....:		45.5	—
Thickness of sample [mm].....:		35	—
Mounting technique used.....:		Clamps mounting (4 points on long side with 2 beams across the module at the long sides)	—
Module breakage .....:		☒ No breakage	—
		☒ No separation from frame or mounting structure	—
		☐ Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
		☐ Breakage occurred, no particles larger than 65 cm ²ejected from sample	—
		☐ Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....: 2024-03-06 for 7-M2-1#, 7-M2-2#, 7-M3# 2024-03-08 for 7-M4#, 7-M6# 2024-02-08 for 7-M12#; 2024-05-08 for 7-M8#						—
Module temperature [℃]....:			25			—
Irradiance [W/m²]....:			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
7-M2-1	13.30	51.29	12.71	43.50	552.9	81.05
7-M2-2	13.36	51.27	12.73	43.54	554.3	80.92
7-M3	13.26	51.18	12.69	43.40	550.7	81.15
7-M4	13.22	51.06	12.63	43.29	546.8	81.01
7-M6	13.30	51.13	12.74	43.25	551.0	81.03
7-M8	13.39	51.45	12.76	43.60	556.3	80.76
7-M12	13.47	51.29	12.81	43.61	558.6	80.85
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-03-06 for 7-M2-1#, 7-M2-2#, 7-M3# 2024-03-08 for 7-M4#,7-M6# 2024-02-08 for 7-M12# 2024-05-08 for 7-M8#, 7-M10#	—
Sample # 7-M2-1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M2-2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 7-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings								P
Test Date [YYYY-MM-DD].....:		2024-03-06 for 7-M2-1#, 7-M2-2#, 7-M3# 2024-03-08 for 7-M4#,7-M6# 2024-02-08 for 7-M12# 2024-05-08 for 7-M8#, 7-M10#						—
Sample #	Markings legible		Not easily removable		No curling			Result
7-M2-1	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
7-M2-2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
7-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
7-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
7-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
7-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
7-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
7-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
Supplementary information: N/A								

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD].....:		2024-03-06 for 7-M2-1#, 7-M2-2#, 7-M3# 2024-03-08 for 7-M4#,7-M6# 2024-02-08 for 7-M12# 2024-05-08 for 7-M8#, 7-M10#		—
Sample #	The black indicating tape is visible through the resulting cut.			Result
7-M2-1	☒ Yes	☐ No		
7-M2-2	☒ Yes	☐ No		P
7-M3	☒ Yes	☐ No		P
7-M4	☒ Yes	☐ No		P
7-M6	☒ Yes	☐ No		P
7-M8	☒ Yes	☐ No		P
7-M10	☒ Yes	☐ No		P
7-M12	☒ Yes	☐ No		P
7-M13	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:	2024-03-06 for 7-M2-1#, 7-M2-2#, 7-M3# 2024-03-08 for 7-M4#,7-M6# 2024-02-08 for 7-M12# 2024-05-08 for 7-M8#, 7-M10#			—
☐ **Method A**				—
Ambient temperature [℃].....:	N/A			—
Current flow applied [A].....:	N/A			—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—
Sample #	IV curve after shading			Result
	Diode 1 working properly	Diode 2 working properly	Diode 3 working properly	
7-M2-1	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
7-M2-2	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
7-M3	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
7-M4	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
7-M6	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
7-M8	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
7-M10	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
7-M12	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMND-72HD570 (BOM8)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-01-10 for 8-M4#, 8-M6#, 8-M10#, 8-M12#, 8-M14#, 8-M15#, 8-M16#, 8-fire 1#, 8-fire 2#, 8-fire 3#; 2024-03-22 for 8-M8#	—
Sample # 8-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M2-1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M2-2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—

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Clause	Requirement + Test	Result - Remark	Verdict
Sample # 8-M16	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	8-M10						—
Test Date [YYYY-MM-DD] .....:	2024-01-16						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	13.75±3%						—
Rated V_{OC} including manufacturing tolerances..:	51.90±3%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	13.49	51.79	12.82	43.95	563.4	80.64	—
Rear	10.60	51.03	9.83	44.45	436.9	80.77	—
BNPI	14.91	51.99	14.09	44.18	622.5	80.30	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-01-16 for 8-M1#, 8-M2-1#, 8-M2-2#, 8-M3#, 8-M6#, 8-M14#; 2024-01-22 for 8-M4#; 2024-02-25 for 8-M12#; 2024-03-27 for 8-M8#						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
8-M1	13.49	51.68	12.85	43.96	564.9	81.03	—
8-M2-1	13.50	51.64	12.88	43.92	565.7	81.15	—
8-M2-2	13.50	51.68	15.50	43.87	565.9	81.11	—
8-M3	13.52	51.71	15.52	43.82	566.2	80.99	—
8-M4	13.49	51.59	12.86	43.80	563.3	80.94	—
8-M6	13.48	51.60	12.87	43.78	563.5	81.01	—
8-M8	13.51	51.67	12.87	43.84	564.2	80.82	—
8-M12	13.52	51.64	12.86	43.85	563.9	80.77	—
8-M14	13.57	51.80	12.85	44.09	566.5	80.59	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-01-16 for 8-M1#, 8-M2-1#, 8-M2-2#, 8-M3#,8-M6#, 8-M14# 2024-01-22 for 8-M4#; 2024-02-25 for 8-M12#; 2024-03-27 for 8-M8#		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
8-M1	>1000	>15.5	No breakdown	×	P
8-M2-1	>1000	>15.5	No breakdown	×	P
8-M2-2	>1000	>15.5	No breakdown	×	P
8-M3	>1000	>15.5	No breakdown	×	P
8-M4	>1000	>15.5	No breakdown	×	P
8-M6	>1000	>15.5	No breakdown	×	P
8-M8	>1000	>15.5	No breakdown	×	P
8-M10	>1000	>15.5	No breakdown	×	P
8-M12	>1000	>15.5	No breakdown	×	P
8-M14	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-01-16 for 8-M1#, 8-M2-1#, 8-M2-2#, 8-M3#, 8-M6# 2024-01-22 for 8-M4# 2024-02-25 for 8-M12#; 2024-03-27 for 8-M8#	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		22.3 for 8-M1#, 8-M2-1#, 8-M2-2#, 8-M3#, 8-M6# 22.5 for 8-M4#; 22.1 for 8-M12#; 22.6 for 8-M8#	—
Solution temperature [℃] .....:		2317 for 8-M1#, 8-M2-1#, 8-M2-2#, 8-M3#, 8-M6# 2252 for 8-M4#; 2235 for 8-M12#; 2219 for 8-M8#	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
8-M1	>1000	>15.5	P
8-M2-1	>1000	>15.5	P
8-M2-2	>1000	>15.5	P
8-M3	>1000	>15.5	P
8-M4	>1000	>15.5	P
8-M6	>1000	>15.5	P
8-M8	>1000	>15.5	P
8-M10	>1000	>15.5	P
8-M12	>1000	>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :		2024-01-16 for 8-M1#, 8-M2-1#, 8-M2-2#, 8-M3#, 8-M6#, 8-M15# 2024-01-22 for 8-M4# 2024-02-25 for 8-M18#, 8-M19#, 8-M20#, 8-M21# 2024-03-27 for 8-M8#		—
Test Date **Final** examination [YYYY-MM-DD] ... :		2024-01-26 for 8-M1# 2024-03-06 for 8-M2-1#, 8-M2-2#, 8-M3#, 8-M6# 2024-03-08 for 8-M4# 2024-03-01 for 8-M18#, 8-M19#, 8-M20#, 8-M21# 2024-03-01 for 8-M15# 2024-05-08 for 8-M8#		—
Maximum over-current protection rating [A]..... :		30		—
Current applied [A] ..... :		75		—
Location of designated grounding point ..... :		The ground hole of one longer side		—
Location of second contacting point ..... :		A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side		—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
8-M1	Initial examination	A: 0.225 B: 0.172 C: 0.180	A: 0.003 B: 0.002 C: 0.002	P
	Preconditioning: MST 37			—
	Final examination	A: 0.384 B: 0.221 C: 0.179	A: 0.005 B: 0.003 C: 0.002	P
8-M2-1	Initial examination	A: 0.273 B: 0.181 C: 0.179	A: 0.003 B: 0.002 C: 0.002	P
	Preconditioning: MST 53, MST 54, MST 52			—
	Final examination	A: 0.303 B: 0.179 C: 0.180	A: 0.004 B: 0.002 C: 0.002	P
8-M2-2	Initial examination	A: 0.277 B: 0.073 C: 0.078	A: 0.003 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 54, MST 52			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.227 B: 0.153 C: 0.074	A: 0.004 B: 0.002 C: 0.001	P
8-M3	Initial examination	A: 0.152 B: 0.142 C: 0.072	A: 0.002 B: 0.002 C: 0.001	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52			—
	Final examination	A: 0.379 B: 0.278 C: 0.180	A: 0.005 B: 0.003 C: 0.002	P
8-M4	Initial examination	A: 0.303 B: 0.157 C: 0.079	A: 0.004 B: 0.002 C: 0.001	P
	Preconditioning: MST 54, MST 51, MST 52			—
	Final examination	A: 0.378 B: 0.305 C: 0.154	A: 0.005 B: 0.004 C: 0.002	P
8-M6	Initial examination	A: 0.302 B: 0.176 C: 0.079	A: 0.004 B: 0.002 C: 0.001	P
	Preconditioning: MST 53, MST 34			—
	Final examination	A: 0.299 B: 0.153 C: 0.155	A: 0.004 B: 0.002 C: 0.002	P
8-M8	Initial examination	A: 0.080 B: 0.077 C: 0.154	A: 0.001 B: 0.001 C: 0.002	P
	Preconditioning: MST 51			—
	Final examination	A: 0.305 B: 0.234 C: 0.310	A: 0.004 B: 0.003 C: 0.004	P
8-M15	Initial examination	A: 0.235 B: 0.080 C: 0.083	A: 0.003 B: 0.001 C: 0.001	P
	Preconditioning: MST 32			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.376 B: 0.231 C: 0.081	A: 0.005 B: 0.003 C: 0.001	P
8-M18	Initial examination	A: 0.177 B: 0.090 C: 0.079	A: 0.002 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.232 B: 0.133 C: 0.149	A: 0.003 B: 0.002 C: 0.002	P
8-M19	Initial examination	A: 0.081 B: 0.081 C: 0.083	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.077 B: 0.081 C: 0.083	A: 0.001 B: 0.001 C: 0.001	P
8-M20	Initial examination	A: 0.078 B: 0.081 C: 0.078	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.153 B: 0.232 C: 0.162	A: 0.002 B: 0.003 C: 0.002	P
8-M21	Initial examination	A: 0.083 B: 0.079 C: 0.080	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.147 B: 0.154 C: 0.083	A: 0.002 B: 0.002 C: 0.001	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-01-16 for 8-M1#, 8-M2-1#, 8-M2-2#, 8-M3#, 8-M6# 2024-01-22 for 8-M4# 2024-03-27 for 8-M8#	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-01-26 for 8-M1# 2024-03-06 for 8-M2-1#,8-M2-2#,8-M3#, 8-M6# 2024-03-08 for 8-M4# 2024-05-08 for 8-M8#	—
Sample #	Position in test sequence:		
8-M1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 37, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
8-M2-1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
8-M2-2	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
8-M3	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52, MST13		—
	Final examination, access?	☐ Yes ☒ No	P
8-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
8-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
8-M8	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 51, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A				
Sample #	8-M1			—
Table 13: MST 37 - Materials creep test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-17/2024-01-26		—
Duration [h] .....:		200		—
Applied temperature [℃] .....:		105 ± 5		—
MST 01: Visual inspection after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-01-26		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
Supplementary information: For clearance and creepage distances see table 1.				
MST 16: Insulation test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-01-26		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-01-26		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied (V, dc) .....:		2 minutes of 1500		—
Solution resistivity (Ω cm) .....:		2287		—
Solution temperature (℃).....:		22.0		—
Measured(MΩ)		Required (MΩ)		Result
>1000		>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B					
Table 14: MST 53 - Damp heat test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-01-19/2024-01-28		—
Applied load [N] .....:			N/A		—
Duration [h] .....:			200		—
Sample #			—		—
8-M2-1			—		—
8-M2-2			—		—
MST 01: Visual inspection after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-01-28		—
Sample # 8-M2-1	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
Sample # 8-M2-2	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-01-28		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
8-M2-1	>1000	>15.5	No breakdown	×	P
8-M2-2	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

Table 15: MST 54 - UV test (front side)			P
Sample #	8-M2-1		—
Test Date [YYYY-MM-DD] start/end .....:		2024-02-05/2024-02-19	—
Module temperature [℃] .....:		63.0	—
Irradiation total [kWh/m²] .....:		60.0	—
Open circuits .....:		☐ Yes ☒ No	P
MST 01: Visual inspection after UV test			—
Test Date [YYYY-MM-DD].....:		2024-02-19	—

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Clause	Requirement + Test	Result - Remark	Verdict

Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-19		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²] This test is conducted in compliance with IEC 61730-2:2023.				

Table 17: MST 54 - UV test (back side)				P
Sample #	8-M2-2			—
Test Date [YYYY-MM-DD] start/end ..... :		2024-02-05/2024-02-19		—
Module temperature [℃] ..... :		60		—
Irradiation total [kWh/m²] ..... :		60		—
Open circuits ..... :		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD]..... :		2024-02-19		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²] This test is conducted in compliance with IEC 61730-2:2023.				

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Clause	Requirement + Test	Result - Remark	Verdict

Table18: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-02-19/2024-02-29		—
Total cycles .....:			10		—
Open circuits .....:			☐ Yes ☒ No		P
Sample #	—				—
8-M2-1	—				—
8-M2-2	—				—
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:			2024-02-29		—
Findings ..... :			☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos			No visual defects		—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:			2024-02-29		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
8-M2-1	>1000	>15.5	No breakdown	x	P
8-M2-2	>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test					—
Test Date [YYYY-MM-DD].....:			2024-02-29		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:			2 minutes of 1500		—
Solution resistivity [Ω cm) .....:			2410		—
Solution temperature [℃] .....:			22.9		—
Sample #	Measured (MΩ)		Required (MΩ)		Result
8-M2-1	>1000		>15.5		P
8-M2-2	>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B1				
Sample #	8-M3			—
Table 19: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-17/2024-01-19		—
Temperature [℃] Duration [h] .....:		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-19		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 20: MST 56 - Dry heat conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-19/2024-01-29		—
Temperature [℃] Duration [h] ..... :		105 ± 5 / 200		—
MST 01: Visual inspection after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-01-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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

Table21: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-30/2024-02-09		—
Total cycles ..... :		10		—
Open circuits ..... :		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-09		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-09		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 22: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-17/2024-02-19		—
Temperature [℃] / Duration [h] ..... :		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-02-19		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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

Table 23: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-19/2024-02-29		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2405		—
Solution temperature [℃] .....:		22.1		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

SEQUENCE C				
Sample #	8-M4			—
Table 24: MST 54 - UV test				P
Front side				—
Test Date [YYYY-MM-DD] start/end .....:		2024-01-23/2024-01-27		—
Module temperature [℃] .....:		62.8		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
Back side (only for bifacial modules)				—
Test Date [YYYY-MM-DD] start/end .....:		2024-01-29/2024-02-02		—
Module temperature [℃] .....:		61.7		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD].....:		2024-02-02		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD].....:		2024-02-02		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-08/2024-02-18			—
Total cycles .....:		50			—
Applied current [A] .....:		15.74 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		80			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-02-18			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-02-18			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance BSI. Size of module 2.58 [m²]					

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

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-02-20/2024-03-01		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-03-01		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2305		—
Solution temperature [℃] .....:		22.2		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD]....:		2024-03-02		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] ....:		40		—
Applied force perpendicular to the mounting surface [N] ....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD]....:		2024-03-02		—
Findings .... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD]....:		2024-03-02		—
Cemented joints....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] ....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD]....:		2024-03-02		—
Cemented joints....:		☒ Yes ☐ No		—
Test Voltage applied [V] ....:		2 minutes of 2025		—
Solution resistivity [Ω cm] ....:		2467		—
Solution temperature [℃] ....:		22.5		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: 1. Size of module 2.58 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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

SEQUENCE D				
Sample #	8-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-01-17/2024-02-29		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-02-29		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2381		—
Solution temperature [℃] .....:		22.6		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-03-05		—
Mounting method ....:	Clamps mounting (4 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-05		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-05		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-03-05		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2533		—
Solution temperature [℃] .... :	22.3		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

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

Supplementary information: Size of module 2.58 [m²]

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

SEQUENCE E				
Sample #	8-M8			—
Table 30: MST 51 - Thermal cycling test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-29/2024-05-06		—
Total cycles .....:		200		—
Applied current [A] .....:		15.86 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages		—
Applied load [N] .....:		5		—
Limiting voltage [V] .....:		80		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2380		—
Solution temperature [℃] .....:		22.9		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	8-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-02-27/2024-02-28	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle……......:	1232 W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	60.9/59.8	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	C24:119.8; D12:120.5; E9:121.3; A13:123.7;	—
Shading rate [%] or number of cells shaded.....:	C24:30; D12:45; E9:35; A13:30	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-28	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-28	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
13.48	51.56	12.82	43.78	561.3	80.76

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-28	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-02-28	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	2421	—
Solution temperature [℃] .....:	22.5	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	12		13	…	21	22	23	24
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 2.58 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	N/A	—
Table 32: MST 21 - Temperature Test		N/A

Sample #	N/A	—
Table 34: MST 26 - Reverse current overload test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G				
Sample #:	8-M14			—
Table 35.2: MST 14 - Impulse voltage test				P
Test Date [YYYY-MM-DD] .....:		2024-01-30		—
Maximum system voltage [V] .....:		*1500*		—
Required Impulse voltage [V].....:		*19680*		—
Measured Impulse voltage [V] .....:		*19680*		P
T_1 [µs].....:		*1.2*		P
T_2 [µs].....:		*50*		P
Thickness of conductive foil [mm] .....:		0.05		—
Results				—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)				P
MST 01: Visual inspection after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-01-30		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-01-30		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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

OTHER TESTS		
Sample #:	8-fire 1, 8-fire 2, 8-fire 3	—
Table 36: MST 23 - Fire test		P
Test Date [YYYY-MM-DD] .....:	2024-01-16	—
Module fire resistance class (A, B, C) .....:	C	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to Zhejiang Gather Uni. Please refer to annex 3 for detailed pictures after test.		

Sample #:	8-M16		—
Table 37: MST 24 - Ignitability test			P
Test Date [YYYY-MM-DD].....:	2024-01-25		—
Flame application point.....:	-		—
Surface exposure.....:	☒ Yes	☐ No	—
Backsheet foil exposure.....:	☐ Yes	☒ No	—
Frame adhesive exposure .....:	☒ Yes	☐ No	—
Edge exposure.....:	☒ Yes	☐ No	—
Junction box adhesive exposure.....:	☒ Yes	☐ No	—
Type label exposure .....:	☐ Yes	☒ No	—
Backrail adhesive exposure.....:	☐ Yes	☒ No	—
Ignition occurs .....:	☐ Yes	☒ No	—
Flame spread less as 150 mm	☒ Yes	☐ No	P
Length of destroyed area.....:	N/A		P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	8-M15	—
Table 38: MST 32 - Module breakage test		P
Test Date [YYYY-MM-DD] .....:	2024-01-25	—
Weight of impactor [kg] .....:	45.5	—
Thickness of sample [mm].....:	35	—
Mounting technique used.....:	Clamps mounting (4 points on long side with 2 beams across the module at the long sides)	—
Module breakage .....:	☒ No breakage	—
	☒ No separation from frame or mounting structure	—
	☐ Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
	☐ Breakage occurred, no particles larger than 65 cm ²ejected from sample	—
	☐ Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos		Result
No visual defects		P
Supplementary information: N/A		

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....: 2024-03-06 for 8-M2-1#, 8-M2-2#, 8-M3# 2024-03-08 for 8-M4#,8-M6# 2024-03-01 for 8-M12#; 2024-05-08 for 8-M8#						—
Module temperature [℃]....:			25			—
Irradiance [W/m²]....:			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
8-M2-1	13.31	51.27	12.68	43.54	552.1	80.91
8-M2-2	13.29	51.42	12.70	43.62	554.0	81.07
8-M3	13.25	51.28	12.66	43.39	549.3	80.84
8-M4	13.18	51.050	12.54	43.29	542.8	80.67
8-M6	13.25	50.90	12.64	43.28	547.1	81.12
8-M8	13.41	51.49	12.76	43.65	557.0	80.67
8-M12	13.47	51.29	12.81	43.61	558.6	80.85
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-03-06 for 8-M2-1#, 8-M2-2#, 8-M3# 2024-03-08 for 8-M4#,8-M6# 2024-03-01 for 8-M12# 2024-05-08 for 8-M8#, 8-M10#	—
Sample # 8-M2-1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M2-2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 8-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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

Table 44: MST 05 - Durability of markings							P
Test Date [YYYY-MM-DD].....:		2024-03-06 for 8-M2-1#, 8-M2-2#, 8-M3# 2024-03-08 for 8-M4#,8-M6# 2024-03-01 for 8-M12# 2024-05-08 for 8-M8#, 8-M10#					—
Sample #	Markings legible		Not easily removable		No curling		Result
8-M2-1	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M2-2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD].....:		2024-03-06 for 8-M2-1#, 8-M2-2#, 8-M3# 2024-03-08 for 8-M4#,8-M6# 2024-03-01 for 8-M12# 2024-05-08 for 8-M8#, 8-M10#		—
Sample #	The black indicating tape is visible through the resulting cut.			Result
8-M2-1	☒ Yes	☐ No		
8-M2-2	☒ Yes	☐ No		P
8-M3	☒ Yes	☐ No		P
8-M4	☒ Yes	☐ No		P
8-M6	☒ Yes	☐ No		P
8-M8	☒ Yes	☐ No		P
8-M10	☒ Yes	☐ No		P
8-M12	☒ Yes	☐ No		P
8-M13	☒ Yes	☐ No		P
Supplementary information: N/A				

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

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:		2024-03-06 for 8-M2-1#, 8-M2-2#, 8-M3# 2024-03-08 for 8-M4#,8-M6# 2024-03-01 for 8-M12# 2024-05-08 for 8-M8#, 8-M10#		—
☐ **Method A**				—
Ambient temperature [℃].....:		N/A		—
Current flow applied [A].....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
8-M2-1	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M2-2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
8-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

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

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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

Module type: TWMNH-48HC435 (BOM9)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-05-22	—
Sample # 9-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 9-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 9-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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

Table 7: MST 02 - Performance at STC and BNPI	N/A

Table 8: MST 03 - Maximum power determination	N/A
Table 9: MST 16 - Initial Insulation test	N/A

Table 10: MST 17 - Initial Wet leakage current test	N/A

Table 11: MST 13 - Continuity test of equipotential bonding	N/A

Table 12: MST 11 - Accessibility test	N/A

SEQUENCE A		
Sample #	N/A	—
Table 13: MST 37 - Materials creep test		N/A

SEQUENCE B	
Table 14: MST 53 - Damp heat test	N/A

Table 15: MST 54 - UV test (front side)	N/A

Table 17: MST 54 - UV test (back side)	N/A

Table18: MST 52 - Humidity freeze test	N/A

SEQUENCE B1		
Sample #	N/A	—
Table 19: MST 55 - Cold conditioning		N/A

Table 20: MST 56 - Dry heat conditioning	N/A

Table21: MST 52 - Humidity freeze test	N/A

Table 22: MST 55 - Cold conditioning	N/A

Table 23: MST 52 - Humidity freeze test	N/A

SEQUENCE C		
Sample #	N/A	—
Table 24: MST 54 - UV test		N/A

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

Table 25: MST 51 - Thermal cycling test	N/A

Table 26: MST 52 - Humidity freeze test	N/A

Table 27: MST 42 - Robustness of terminations test		N/A
SEQUENCE D		
Sample #	4-M6	—
Table 28: MST 53 - Damp heat test		N/A

Table 29: MST 34 - Static mechanical load test	N/A

SEQUENCE E		
Sample #	N/A	—
Table 30: MST 51 - Thermal cycling test		N/A
SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

Sample #	N/A	—
Table 33: MST 22 - Hot-spot endurance test		N/A

Sample #	N/A	—
Table 32: MST 21 - Temperature Test		N/A

Sample #	N/A	—
Table 34: MST 26 - Reverse current overload test		N/A
SEQUENCE G		
Sample #:	N/A	—
Table 35.2: MST 14 - Impulse voltage test		N/A

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

OTHER TESTS		
Sample #:	9-fire 1, 9-fire 2, 9-fire 3	—
Table 36: MST 23 - Fire test		N/A
Test Date [YYYY-MM-DD] .....:	2024-05-24	—
Module fire resistance class (A, B, C) .....:	A	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to CPTC. Please refer to annex 3 for detailed pictures after test.		

Sample #:	N/A	—
Table 37: MST 24 - Ignitability test		N/A

Sample #:	N/A	—
Table 38: MST 32 - Module breakage test		N/A
Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final	N/A

Table 43: MST 01 - Final Visual inspection	N/A

Table 44: MST 05 - Durability of markings	N/A

Table 45: MST 06 - Sharp edge test	N/A

Table 46: MST 07 - Bypass diode functionality test	P

Table 47: MST 33a - Test for general screw connections	N/A

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

Table 48: MST 33b - Test for locking screws	N/A

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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

Module type: TWMNH-48HD435 (BOM10)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-05-22	—
Sample # 10-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 10-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 10-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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

Table 7: MST 02 - Performance at STC and BNPI	N/A

Table 8: MST 03 - Maximum power determination	N/A
Table 9: MST 16 - Initial Insulation test	N/A

Table 10: MST 17 - Initial Wet leakage current test	N/A

Table 11: MST 13 - Continuity test of equipotential bonding	N/A

Table 12: MST 11 - Accessibility test	N/A

SEQUENCE A		
Sample #	N/A	—
Table 13: MST 37 - Materials creep test		N/A

SEQUENCE B	
Table 14: MST 53 - Damp heat test	N/A

Table 15: MST 54 - UV test (front side)	N/A

Table 17: MST 54 - UV test (back side)	N/A

Table18: MST 52 - Humidity freeze test	N/A

SEQUENCE B1		
Sample #	N/A	—
Table 19: MST 55 - Cold conditioning		N/A

Table 20: MST 56 - Dry heat conditioning	N/A

Table21: MST 52 - Humidity freeze test	N/A

Table 22: MST 55 - Cold conditioning	N/A

Table 23: MST 52 - Humidity freeze test	N/A

SEQUENCE C		
Sample #	N/A	—
Table 24: MST 54 - UV test		N/A

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

Table 25: MST 51 - Thermal cycling test	N/A

Table 26: MST 52 - Humidity freeze test	N/A

Table 27: MST 42 - Robustness of terminations test		N/A
SEQUENCE D		
Sample #	4-M6	—
Table 28: MST 53 - Damp heat test		N/A

Table 29: MST 34 - Static mechanical load test	N/A

SEQUENCE E		
Sample #	N/A	—
Table 30: MST 51 - Thermal cycling test		N/A
SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

Sample #	N/A	—
Table 33: MST 22 - Hot-spot endurance test		N/A

Sample #	N/A	—
Table 32: MST 21 - Temperature Test		N/A

Sample #	N/A	—
Table 34: MST 26 - Reverse current overload test		N/A
SEQUENCE G		
Sample #:	N/A	—
Table 35.2: MST 14 - Impulse voltage test		N/A

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

OTHER TESTS		
Sample #:	10-fire 1, 10-fire 2, 10-fire 3	—
Table 36: MST 23 - Fire test		N/A
Test Date [YYYY-MM-DD] .....:	2024-05-24	—
Module fire resistance class (A, B, C) .....:	A	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to CPTC. Please refer to annex 3 for detailed pictures after test.		

Sample #:	N/A	—
Table 37: MST 24 - Ignitability test		N/A

Sample #:	N/A	—
Table 38: MST 32 - Module breakage test		N/A

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD].....:			N/A			—
Module temperature [℃].....:			N/A			—
Irradiance [W/m²].....:			N/A			—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
N/A	N/A	N/A	N/A	N/A	N/A	N/A
Supplementary information: N/A						

Table 43: MST 01 - Final Visual inspection	N/A

Table 44: MST 05 - Durability of markings	N/A

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

Table 45: MST 06 - Sharp edge test	N/A

Table 46: MST 07 - Bypass diode functionality test	P

Table 47: MST 33a - Test for general screw connections	N/A

Table 48: MST 33b - Test for locking screws	N/A

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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

Module type: TWMNH-48HD435 (BOM11)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-05-22	—
Sample # 11-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 11-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 11-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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

Table 7: MST 02 - Performance at STC and BNPI	N/A

Table 8: MST 03 - Maximum power determination	N/A
Table 9: MST 16 - Initial Insulation test	N/A

Table 10: MST 17 - Initial Wet leakage current test	N/A

Table 11: MST 13 - Continuity test of equipotential bonding	N/A

Table 12: MST 11 - Accessibility test	N/A

SEQUENCE A		
Sample #	N/A	—
Table 13: MST 37 - Materials creep test		N/A

SEQUENCE B	
Table 14: MST 53 - Damp heat test	N/A

Table 15: MST 54 - UV test (front side)	N/A

Table 17: MST 54 - UV test (back side)	N/A

Table18: MST 52 - Humidity freeze test	N/A

SEQUENCE B1		
Sample #	N/A	—
Table 19: MST 55 - Cold conditioning		N/A

Table 20: MST 56 - Dry heat conditioning	N/A

Table21: MST 52 - Humidity freeze test	N/A

Table 22: MST 55 - Cold conditioning	N/A

Table 23: MST 52 - Humidity freeze test	N/A

SEQUENCE C		
Sample #	N/A	—
Table 24: MST 54 - UV test		N/A

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

Table 25: MST 51 - Thermal cycling test	N/A

Table 26: MST 52 - Humidity freeze test	N/A

Table 27: MST 42 - Robustness of terminations test		N/A
SEQUENCE D		
Sample #	4-M6	—
Table 28: MST 53 - Damp heat test		N/A

Table 29: MST 34 - Static mechanical load test	N/A

SEQUENCE E		
Sample #	N/A	—
Table 30: MST 51 - Thermal cycling test		N/A
SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

Sample #	N/A	—
Table 33: MST 22 - Hot-spot endurance test		N/A

Sample #	N/A	—
Table 32: MST 21 - Temperature Test		N/A

Sample #	N/A	—
Table 34: MST 26 - Reverse current overload test		N/A
SEQUENCE G		
Sample #:	N/A	—
Table 35.2: MST 14 - Impulse voltage test		N/A

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

OTHER TESTS		
Sample #:	11-fire 1, 11-fire 2, 11-fire 3	—
Table 36: MST 23 - Fire test		N/A
Test Date [YYYY-MM-DD] .....:	2024-05-24	—
Module fire resistance class (A, B, C) .....:	A	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to CPTC. Please refer to annex 3 for detailed pictures after test.		

Sample #:	N/A	—
Table 37: MST 24 - Ignitability test		N/A

Sample #:	N/A	—
Table 38: MST 32 - Module breakage test		N/A
Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final	N/A

Table 43: MST 01 - Final Visual inspection	N/A

Table 44: MST 05 - Durability of markings	N/A

Table 45: MST 06 - Sharp edge test	N/A

Table 46: MST 07 - Bypass diode functionality test	P

Table 47: MST 33a - Test for general screw connections	N/A

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

Table 48: MST 33b - Test for locking screws	N/A

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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

Module type: TWMNH-48HD435 (BOM12)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-05-22	—
Sample # 12-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 12-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 12-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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

Table 7: MST 02 - Performance at STC and BNPI	N/A

Table 8: MST 03 - Maximum power determination	N/A
Table 9: MST 16 - Initial Insulation test	N/A

Table 10: MST 17 - Initial Wet leakage current test	N/A

Table 11: MST 13 - Continuity test of equipotential bonding	N/A

Table 12: MST 11 - Accessibility test	N/A

SEQUENCE A		
Sample #	N/A	—
Table 13: MST 37 - Materials creep test		N/A

SEQUENCE B	
Table 14: MST 53 - Damp heat test	N/A

Table 15: MST 54 - UV test (front side)	N/A

Table 17: MST 54 - UV test (back side)	N/A

Table18: MST 52 - Humidity freeze test	N/A

SEQUENCE B1		
Sample #	N/A	—
Table 19: MST 55 - Cold conditioning		N/A

Table 20: MST 56 - Dry heat conditioning	N/A

Table21: MST 52 - Humidity freeze test	N/A

Table 22: MST 55 - Cold conditioning	N/A

Table 23: MST 52 - Humidity freeze test	N/A

SEQUENCE C		
Sample #	N/A	—
Table 24: MST 54 - UV test		N/A

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

Table 25: MST 51 - Thermal cycling test	N/A

Table 23: MST 52 - Humidity freeze test	N/A

Table 27: MST 42 - Robustness of terminations test	N/A

SEQUENCE D		
Sample #	4-M6	—
Table 28: MST 53 - Damp heat test		N/A

Table 29: MST 34 - Static mechanical load test	N/A

SEQUENCE E		
Sample #	N/A	—
Table 30: MST 51 - Thermal cycling test		N/A

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

Sample #	N/A	—
Table 33: MST 22 - Hot-spot endurance test		N/A

Sample #	N/A	—
Table 32: MST 21 - Temperature Test		N/A

Sample #	N/A	—
Table 34: MST 26 - Reverse current overload test		N/A

SEQUENCE G		
Sample #:	N/A	—
Table 35.2: MST 14 - Impulse voltage test		N/A

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

OTHER TESTS		
Sample #:	12-fire 1, 12-fire 2, 12-fire 3	—
Table 36: MST 23 - Fire test		N/A
Test Date [YYYY-MM-DD] .....:	2024-05-24	—
Module fire resistance class (A, B, C) .....:	A	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to CPTC. Please refer to annex 3 for detailed pictures after test.		

Sample #:	N/A	—
Table 37: MST 24 - Ignitability test		N/A

Sample #:	N/A	—
Table 38: MST 32 - Module breakage test		N/A
Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final	N/A

Table 43: MST 01 - Final Visual inspection	N/A

Table 44: MST 05 - Durability of markings	N/A

Table 45: MST 06 - Sharp edge test	N/A

Table 46: MST 07 - Bypass diode functionality test	P

Table 47: MST 33a - Test for general screw connections	N/A

Table 48: MST 33b - Test for locking screws	N/A

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

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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

Module type: TWMNH-48HC435 (BOM13)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-03-05	—
Sample # 13-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M16	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—

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Sample # 13-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	13-M10						—
Test Date [YYYY-MM-DD] .....:	2024-03-07						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	15.90±3%						—
Rated V_{OC} including manufacturing tolerances..:	34.49±3%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	15.24	35.02	14.64	29.72	435.0	81.52	—
Rear	11.19	34.69	10.75	29.89	321.2	82.79	—
BNPI	16.73	35.12	16.01	29.85	478.0	81.33	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-03-07						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
13-M1	15.23	34.94	14.58	29.83	434.8	81.72	—
13-M4	15.22	34.99	14.61	29.72	434.2	81.51	—
13-M6	15.26	34.99	14.63	29.68	434.3	81.32	—
13-M8	15.25	35.01	14.63	29.72	434.7	81.40	—
13-M12	15.24	35.02	14.62	29.72	434.3	81.39	—
13-M13	15.26	34.94	14.61	29.79	435.2	81.62	—
13-M14	15.17	34.93	14.60	29.79	435.0	82.12	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-03-07		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
13-M1	>1000	>20.1	No breakdown	×	P
13-M4	>1000	>20.1	No breakdown	×	P
13-M6	>1000	>20.1	No breakdown	×	P
13-M8	>1000	>20.1	No breakdown	×	P
13-M10	>1000	>20.1	No breakdown	×	P
13-M12	>1000	>20.1	No breakdown	×	P
13-M13	>1000	>20.1	No breakdown	×	P
13-M14	>1000	>20.1	No breakdown	×	P
Supplementary information: Size of module 1.99 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-03-07	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		2296	—
Solution temperature [℃] .....:		22.3	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
13-M1	>1000	>20.1	P
13-M4	>1000	>20.1	P
13-M6	>1000	>20.1	P
13-M8	>1000	>20.1	P
13-M10	>1000	>20.1	P
13-M12	>1000	>20.1	P
13-M13	>1000	>20.1	P
Supplementary information: Size of module 1.99 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :		2024-03-07		—
Test Date **Final** examination [YYYY-MM-DD] ... :		2024-06-14		—
Maximum over-current protection rating [A]..... :		30		—
Current applied [A] ..... :		75		—
Location of designated grounding point ..... :		The ground hole of one longer side		—
Location of second contacting point ..... :		A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side		—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
13-M1	Initial examination	A: 0.040 B: 0.038 C: 0.035	A: 0.001 B: 0.001 C: <0.001	P
	Preconditioning: MST 37			—
	Final examination	A: 0.036 B: 0.036 C: 0.032	A: <0.001 B: <0.001 C: <0.001	P
13-M4	Initial examination	A: 0.038 B: 0.036 C: 0.032	A: 0.001 B: <0.001 C: <0.001	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42			—
	Final examination	A: 0.034 B: 0.033 C: 0.031	A: <0.001 B: <0.001 C: <0.001	P
13-M6	Initial examination	A: 0.036 B: 0.034 C: 0.030	A: <0.001 B: <0.001 C: 0.001	P
	Preconditioning: MST 53, MST 34			—
	Final examination	A: 0.034 B: 0.032 C: 0.030	A: <0.001 B: <0.001 C: <0.001	P
13-M8	Initial examination	A: 0.039 B: 0.035 C: 0.033	A: 0.001 B: <0.001 C: <0.001	P
	Preconditioning: MST 51			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.037 B: 0.033 C: 0.030	A: <0.001 B: <0.001 C: <0.001	P
13-M15	Initial examination	A: 0.038 B: 0.036 C: 0.035	A: 0.001 B: <0.001 C: <0.001	P
	Preconditioning: MST 32			—
	Final examination	A: 0.040 B: 0.036 C: 0.037	A: 0.001 B: <0.001 C: <0.001	P
13-M18	Initial examination	A: 0.040 B: 0.036 C: 0.035	A: 0.001 B: <0.001 C: <0.001	P
	Preconditioning: MQT 21			—
	Final examination	N/A	N/A	N/A
13-M19	Initial examination	A: 0.042 B: 0.039 C: 0.035	A: 0.001 B: 0.001 C: <0.001	P
	Preconditioning: MQT 21			—
	Final examination	N/A	N/A	N/A
13-M20	Initial examination	A: 0.036 B: 0.035 C: 0.033	A: <0.001 B: <0.001 C: <0.001	P
	Preconditioning: MQT 21			—
	Final examination	N/A	N/A	N/A
13-M21	Initial examination	A: 0.039 B: 0.033 C: 0.035	A: 0.001 B: <0.001 C: <0.001	P
	Preconditioning: MQT 21			—
	Final examination	N/A	N/A	N/A
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-03-07	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-06-14	—
Sample #	Position in test sequence:		
13-M1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 37, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
13-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
13-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
13-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 51, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A				
Sample #	13-M1			—
Table 13: MST 37 - Materials creep test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-12/2024-04-23		—
Duration [h] .....:		200		—
Applied temperature [℃] .....:		105 ± 5		—
MST 01: Visual inspection after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-04-23		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
Supplementary information: For clearance and creepage distances see table 1.				
MST 16: Insulation test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-04-23		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>20.1	No breakdown	×	P
MST 17: Wet leakage current test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-04-23		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied (V, dc) .....:		2 minutes of 1500		—
Solution resistivity (Ω cm) .....:		2056		—
Solution temperature (℃).....:		22.4		—
Measured(MΩ)		Required (MΩ)		Result
>1000		>20.1		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 1.99 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B	
Table 14: MST 53 - Damp heat test	N/A

Table 15: MST 54 - UV test (front side)	N/A

Table 17: MST 54 - UV test (back side)	N/A

Table18: MST 52 - Humidity freeze test	N/A

SEQUENCE B1		
Sample #	N/A	—
Table 19: MST 55 - Cold conditioning		N/A

Table 20: MST 56 - Dry heat conditioning	N/A

Table21: MST 52 - Humidity freeze test	N/A

Table 22: MST 55 - Cold conditioning	N/A

Table 23: MST 52 - Humidity freeze test	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE C				
Sample #	13-M4			—
Table 24: MST 54 - UV test				P
Front side				
Test Date [YYYY-MM-DD] start/end .....:		2024-03-18/2024-03-22		—
Module temperature [℃] .....:		60.1		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
Back side (only for bifacial modules)				
Test Date [YYYY-MM-DD] start/end .....:		2024-03-22/2024-03-25		—
Module temperature [℃] .....:		59.8		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD].....:		2024-03-25		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD].....:		2024-03-25		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>20.1	No breakdown	x	P
Supplementary information: Size of module 1.99 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-12/2024-04-19			—
Total cycles .....:		50			—
Applied current [A] .....:		17.76 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		80			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-04-19			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-04-19			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>20.1	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance BSI. Size of module 1.99 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-26/2024-05-06		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>20.1	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2213		—
Solution temperature [℃] .....:		22.3		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>20.1		P
Supplementary information: Size of module 1.99 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD].....:		2024-05-06		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] .....:		40		—
Applied force perpendicular to the mounting surface [N] .....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>20.1	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V] .....:		2 minutes of 2025		—
Solution resistivity [Ω cm] .....:		2326		—
Solution temperature [℃] .....:		22.4		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>20.1		P
Supplementary information: 1. Size of module 1.99 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE D				
Sample #	13-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-25/2024-05-06		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>20.1	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2345		—
Solution temperature [℃] .....:		21.9		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>20.1		P
Supplementary information: Size of module 1.99 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-06-07		—
Mounting method ....:	Clamps mounting (4 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-06-07		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-06-07		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>20.1	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-06-07		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2302		—
Solution temperature [℃] .... :	21.4		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>20.1	P

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information: Size of module 1.99 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE E				
Sample #	13-M8			—
Table 30: MST 51 - Thermal cycling test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-12/2024-05-13		—
Total cycles .....:		200		—
Applied current [A] .....:		17.76 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages		—
Applied load [N] .....:		5		—
Limiting voltage [V] .....:		80		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-13		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-13		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>20.1	No breakdown	x	P
MST 17: Wet leakage current test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-13		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2365		—
Solution temperature [℃] .....:		22.6		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>20.1		P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 1.99 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	13-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-05-30	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle…….....:	1220W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	59.1/57.6	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	D11: 123.6; E13: 123.8; E15: 110.4; A2: 96.6	—
Shading rate [%] or number of cells shaded.....:	D11: 17; E13: 19; E15: 19; A2: 8	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-05-30	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-05-30	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
15.365	34.968	14.671	29.712	435.91	81.14

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-05-30	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>20.1	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-05-30	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	2309	—
Solution temperature [℃] .....:	21.3	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>20.1	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	8		12	…	13	14	15	16
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 1.99 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	13-M13			—
Table 32: MST 21 - Temperature Test				P
Reference solar irradiance (W/m²) .....:	1000 W/m²			—
Reference ambient temperature (℃) .....:	40			—
Module at MPP				
Measuring location:	Component temperature T_{OBS} (℃)	Normalized temperature T_{CON} (℃)	Component temperature limit (℃)	—
PV module frontsheet above the centre cell	74.7	75.3	Glass	—
PV module backsheet below the centre cell	72.4	73.4	Glass	—
Terminal enclosure interior surface	73.7	73.4	110	P
Field wiring terminals	78.7	81.4	110	P
Insulation of the field wiring leads	72.7	71.6	110	P
External connector bodies	72.7	74.6	105	P
Bypass diode bodies	79.4	80.7	200	P
MST 01: Visual inspection after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-05-14			—
Findings ..... :	☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-05-14			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, DC) .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>20.1	No breakdown	×	P
MST 17: Wet leakage current test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-05-14			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, dc) .....:	2 minutes of 1500			—
Solution resistivity (Ω cm) .....:	2402			—
Solution temperature (℃) .....:	22.8			—
Measured (MΩ)	Required (MΩ)			Result
>1000	>20.1			P
Supplementary information: Size of module 1.99 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	13-M13			—
Table 34: MST 26 - Reverse current overload test				P
Test Date [YYYY-MM-DD] .....:		2024-05-15		—
Module over-current protection rating [A].....:		30		—
Test current [A].....:		40.5		—
Range of applied voltage [V] .....:		43.7/39.8		—
Test duration .....:		2 hours		—
Observations				Result
Maximum external module surface temperature during the test [℃] .....:		82.2		P
MST 01: Visual inspection after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-05-15		—
Findings..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-05-15		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>20.1	No breakdown	x	P
MST 17: Wet leakage current test after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-05-15		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm].....:		2315		—
Solution temperature [℃] .....:		22.5		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>20.1		P
Supplementary information: Size of module 1.99 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G			
Sample #:	13-M14		—
Table 35.2: MST 14 - Impulse voltage test			P
Test Date [YYYY-MM-DD] .....:		2024-06-24	—
Maximum system voltage [V] .....:		*1500*	—
Required Impulse voltage [V].....:		19680	—
Measured Impulse voltage [V] .....:		19680	P
T_1 [µs].....:		1.2	P
T_2 [µs].....:		50	P
Thickness of conductive foil [mm] .....:		0.05	—
Results			—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)			P
MST 01: Visual inspection after Impulse voltage test			—
Test Date [YYYY-MM-DD].....:		2024-06-24	—
Findings ..... :		☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos		No visual defects	—
MST 16: Insulation test after Impulse voltage test			—
Test Date [YYYY-MM-DD].....:		2024-06-24	—
Cemented joints..... :		☐ Yes ☒ No	—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000	—
Measured	Required	Dielectric breakdown	Result
MΩ	MΩ	Yes (description) / No	
>1000	>20.1	No breakdown / x	P
Supplementary information: This test is subcontracted to CPVT. Size of module 1.99 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

OTHER TESTS		
Sample #:	13-fire 1, 13-fire 2, 13-fire 3	—
Table 36: MST 23 - Fire test		P
Test Date [YYYY-MM-DD] .....:	2024-06-25	—
Module fire resistance class (A, B, C) .....:	C	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to CPVT. Please refer to annex 3 for detailed pictures after test.		

Sample #:	13-M16		—
Table 37: MST 24 - Ignitability test			P
Test Date [YYYY-MM-DD].....:	2024-06-24		—
Flame application point.....:	-		—
Surface exposure.....:	☒ Yes	☐ No	—
Backsheet foil exposure.....:	☐ Yes	☒ No	—
Frame adhesive exposure .....:	☒ Yes	☐ No	—
Edge exposure.....:	☒ Yes	☐ No	—
Junction box adhesive exposure.....:	☒ Yes	☐ No	—
Type label exposure .....:	☐ Yes	☒ No	—
Backrail adhesive exposure.....:	☐ Yes	☒ No	—
Ignition occurs .....:	☐ Yes	☒ No	—
Flame spread less as 150 mm	☒ Yes	☐ No	P
Length of destroyed area.....:	N/A		P
Supplementary information: This test is subcontracted to CPVT.			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	13-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:		2024-05-10	—
Weight of impactor [kg] .....:		45.5	—
Thickness of sample [mm].....:		35	—
Mounting technique used.....:		Clamps mounting (4 points on long side with 2 beams across the module at the long sides)	—
Module breakage .....:		☒ No breakage	—
		☒ No separation from frame or mounting structure	—
		☐ Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
		☐ Breakage occurred, no particles larger than 65 cm ²ejected from sample	—
		☐ Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

Table 41: MST 12 - Cut susceptibility test	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....::			2024-06-14			—
Module temperature [℃]....::			25			—
Irradiance [W/m²]....::			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A)	Vmp [V]	Pmp [W]	FF [%]
13-M4	15.228	34.645	14.494	29.355	425.47	80.65
13-M6	15.130	34.898	14.414	29.596	426.61	80.80
13-M8	15.214	34.909	14.587	29.712	433.41	81.61
13-M12	15.365	34.968	14.671	29.712	435.91	81.14
13-M13	15.272	34.971	14.636	29.713	434.88	81.43
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-06-14	—
Sample # 13-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings							P
Test Date [YYYY-MM-DD].....:		2024-06-14					—
Sample #	Markings legible		Not easily removable		No curling		Result
13-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD].....:		2024-06-14		—
Sample #	The black indicating tape is visible through the resulting cut.			Result
13-M4	☒ Yes	☐ No		P
13-M6	☒ Yes	☐ No		P
13-M8	☒ Yes	☐ No		P
13-M10	☒ Yes	☐ No		P
13-M12	☒ Yes	☐ No		P
13-M13	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD]....:		2024-06-14		—
☐ **Method A**				—
Ambient temperature [℃]....:		N/A		—
Current flow applied [A]....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
13-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P

Supplementary information: N/A

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD].....:		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD].....:		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMHF-66HD715 (BOM14)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-01-11	—
Sample # 14-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M11	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—

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Clause	Requirement + Test	Result - Remark	Verdict
Sample # 14-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M16	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 11-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 11-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 11-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	14-M10						—
Test Date [YYYY-MM-DD] .....:	2024-03-06						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	17.98±5%						—
Rated V_{OC} including manufacturing tolerances..:	50.22±5%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	17.40	49.72	16.63	42.81	712.0	82.30	—
Rear	15.14	49.44	14.03	43.04	603.8	80.67	—
BNPI	19.52	49.89	18.47	42.91	792.6	81.39	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-03-06						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
14-M1	17.43	49.93	16.64	42.92	714.2	82.07	—
14-M2	17.42	49.89	16.61	42.97	713.8	82.13	—
14-M3	17.48	49.97	16.68	42.88	715.2	81.88	—
14-M4	17.41	49.74	16.63	42.83	712.2	82.24	—
14-M6	17.42	49.75	16.63	42.86	712.8	82.25	—
14-M8	17.41	49.70	16.62	42.83	711.9	82.27	—
14-M11	17.43	49.75	16.64	42.85	713.0	82.22	—
14-M12	17.44	49.76	16.63	42.91	713.6	82.23	—
14-M13	17.45	49.96	16.66	42.89	714.6	81.97	—
14-M14	17.44	49.94	16.65	42.89	714.1	81.99	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-03-06		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
14-M1	>1000	>12.9	No breakdown	×	P
14-M2	>1000	>12.9	No breakdown	×	P
14-M3	>1000	>12.9	No breakdown	×	P
14-M4	>1000	>12.9	No breakdown	×	P
14-M6	>1000	>12.9	No breakdown	×	P
14-M8	>1000	>12.9	No breakdown	×	P
14-M10	>1000	>12.9	No breakdown	×	P
14-M11	>1000	>12.9	No breakdown	×	P
14-M12	>1000	>12.9	No breakdown	×	P
14-M13	>1000	>12.9	No breakdown	×	P
14-M14	>1000	>12.9	No breakdown	×	P
Supplementary information: Size of module 3.11 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-03-06	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		2293	—
Solution temperature [℃] .....:		21.3	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
14-M1	>1000	>12.9	P
14-M2	>1000	>12.9	P
14-M3	>1000	>12.9	P
14-M4	>1000	>12.9	P
14-M6	>1000	>12.9	P
14-M8	>1000	>12.9	P
14-M10	>1000	>12.9	P
14-M11	>1000	>12.9	P
14-M12	>1000	>12.9	P
14-M13	>1000	>12.9	P
Supplementary information: Size of module 3.11 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :		2024-03-06 for 14-M1#, 14-M2#, 14-M3#, 14-M4#, 14-M6#, 14-M8#, 14-M15# 2024-04-01 for 14-M18#, 14-M19#, 14-M20#, 14-M21#		—
Test Date **Final** examination [YYYY-MM-DD] ... :		2024-03-28 for 14-M1#; 2024-05-31 for 14-M2# 2024-05-09 for 14-M3# 2024-04-30 for 14-M4#, 14-M6# 2024-04-24 for 14-M8#; 2024-03-05 for 14-M15# 2024-04-12 for 14-M18#, 14-M19#, 14-M20#, 14-M21#		—
Maximum over-current protection rating [A]..... :		35		—
Current applied [A] ..... :		87.5		—
Location of designated grounding point ..... :		The ground hole of one longer side		—
Location of second contacting point..... :		A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side		—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
14-M1	Initial examination	A: 0.091 B: 0.089 C: 0.093	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 37			—
	Final examination	A: 0.270 B: 0.355 C: 0.182	A: 0.003 B: 0.004 C: 0.002	P
14-M2	Initial examination	A: 0.186 B: 0.183 C: 0.092	A: 0.002 B: 0.002 C: 0.001	P
	Preconditioning: MST 53, MST 54, MST 52，MST 54, MST 52			—
	Final examination	A: 0.351 B: 0.441 C: 0.619	A: 0.004 B: 0.005 C: 0.007	P
14-M3	Initial examination	A: 0.181 B: 0.183 C: 0.179	A: 0.002 B: 0.002 C: 0.002	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.616 B: 0.356 C: 0.705	A: 0.007 B: 0.004 C: 0.008	P
14-M4	Initial examination	A: 0.092 B: 0.096 C: 0.094	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 54, MST 51, MST 52			—
	Final examination	A: 0.531 B: 0.357 C: 0.441	A: 0.006 B: 0.004 C: 0.005	P
14-M6	Initial examination	A: 0.180 B: 0.094 C: 0.177	A: 0.002 B: 0.001 C: 0.002	P
	Preconditioning: MST 53, MST 34,			—
	Final examination	A: 0.614 B: 0.528 C: 0.710	A: 0.007 B: 0.006 C: 0.008	P
14-M8	Initial examination	A: 0.092 B: 0.178 C: 0.089	A: 0.001 B: 0.002 C: 0.001	P
	Preconditioning: MST 51			—
	Final examination	A: 0.530 B: 0.618 C: 0.615	A: 0.006 B: 0.007 C: 0.007	P
14-M15	Initial examination	A: 0.089 B: 0.092 C: 0.095	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 32			—
	Final examination	A: 0.710 B: 0.708 C: 0.792	A: 0.008 B: 0.009 C: 0.009	P
14-M18	Initial examination	A: 0.089 B: 0.090 C: 0.093	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.445 B: 0.358 C: 0.529	A: 0.005 B: 0.004 C: 0.006	P

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Clause	Requirement + Test	Result - Remark		Verdict
14-M19	Initial examination	A: 0.092 B: 0.267 C: 0.184	A: 0.001 B: 0.003 C: 0.002	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.709 B: 0.530 C: 0.442	A: 0.008 B: 0.006 C: 0.005	P
14-M20	Initial examination	A: 0.093 B: 0.090 C: 0.088	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.268 B: 0.444 C: 0.182	A: 0.003 B: 0.005 C: 0.002	P
14-M21	Initial examination	A: 0.089 B: 0.184 C: 0.180	A: 0.001 B: 0.002 C: 0.002	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.266 B: 0.359 C: 0.529	A: 0.003 B: 0.004 C: 0.006	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-03-06	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-03-28 for 14-M1#; 2024-05-31 for 14-M2# 2024-05-09 for 14-M3# 2024-04-30 for 14-M4#, 14-M6# 2024-04-24 for 14-M8#	—
Sample #	Position in test sequence:		
14-M1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 37, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
14-M2	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
14-M3	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
14-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
14-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
14-M8	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 51, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A				
Sample #	14-M1			—
Table 13: MST 37 - Materials creep test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-19/2024-03-28		—
Duration [h] .....:		200		—
Applied temperature [℃] .....:		105 ± 5		—
MST 01: Visual inspection after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-03-28		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
Supplementary information: For clearance and creepage distances see table 1.				
MST 16: Insulation test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-03-28		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	×	P
MST 17: Wet leakage current test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-03-28		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied (V, dc) .....:		2 minutes of 1500		—
Solution resistivity (Ω cm) .....:		2289		—
Solution temperature (℃).....:		21.3		—
Measured(MΩ)		Required (MΩ)		Result
>1000		>12.9		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B					
Table 14: MST 53 - Damp heat test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-03-07/2024-03-16		—
Applied load [N] .....:			N/A		—
Duration [h] .....:			200		—
Sample #	—				—
14-M2	—				—
MST 01: Visual inspection after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-03-16		—
Sample # 14-M2	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-03-16		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
14-M2	>1000	>12.9	No breakdown	×	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 3.11 [m²]					

Table 15: MST 54 - UV test (front side)			P
Sample #	14-M2		—
Test Date [YYYY-MM-DD] start/end .....:		2024-03-26/2024-04-10	—
Module temperature [℃] .....:		60.0	—
Irradiation total [kWh/m²] .....:		60.0	—
Open circuits .....:		☐ Yes ☒ No	P
MST 01: Visual inspection after UV test			—
Test Date [YYYY-MM-DD].....:		2024-04-10	—
Findings ..... :		☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos		No visual defects	—
MST 16: Insulation test after UV test			—
Test Date [YYYY-MM-DD].....:		2024-04-10	—

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Clause	Requirement + Test	Result - Remark	Verdict

Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	×	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 3.11 [m²]				

Table16: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end ..... :			2024-04-17/2024-04-27		—
Total cycles ..... :			10		—
Open circuits ..... :			☐ Yes ☒ No		P
Sample #	—				—
14-M2	—				—
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD]..... :			2024-04-27		—
Findings ..... :			☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos			No visual defects		—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD]..... :			2024-04-27		—
Cemented joints ..... :			☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
14-M2	>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test					—
Test Date [YYYY-MM-DD]..... :			2024-04-27		—
Cemented joints..... :			☐ Yes ☒ No		—
Test Voltage applied [V, dc]..... :			2 minutes of 1500		—
Solution resistivity [Ω cm) ..... :			2410		—
Solution temperature [℃] ..... :			22.9		—
Sample #	Measured (MΩ)		Required (MΩ)		Result
14-M2	>1000		>12.9		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 3.11 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 17: MST 54 - UV test (back side)					P
Sample #	14-M2				—
Test Date [YYYY-MM-DD] start/end .....:		2024-04-30/2024-05-14			—
Module temperature [℃] .....:		60.0			—
Irradiation total [kWh/m²] .....:		60.0			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after UV test					—
Test Date [YYYY-MM-DD].....:		2024-05-14			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after UV test					—
Test Date [YYYY-MM-DD].....:		2024-05-14			—
Cemented joints .....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>12.9	No breakdown		x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 3.11 [m²]					

Table18: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-05-17/2024-05-27			—
Total cycles .....:		10			—
Open circuits .....:		☐ Yes ☒ No			P
Sample #	—				—
14-M2	—				—
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-05-27			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-05-27			—
Cemented joints .....:		☐ Yes ☒ No			—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
14-M2	>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test					—
Test Date [YYYY-MM-DD].....:			2024-05-27		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:			2 minutes of 1500		—
Solution resistivity [Ω cm) .....:			2352		—
Solution temperature [℃] .....:			23.0		—
Sample #	Measured (MΩ)		Required (MΩ)		Result
14-M2	>1000		>12.9		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 3.11 [m²]					

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

SEQUENCE B1				
Sample #	14-M3			—
Table 19: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-13/2024-03-15		—
Temperature [℃] Duration [h] .....:		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-15		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-15		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
Supplementary information: Size of module 3.11 [m²]				

Table 20: MST 56 - Dry heat conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-19/2024-03-28		—
Temperature [℃] Duration [h] ..... :		105 ± 5 / 200		—
MST 01: Visual inspection after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-28		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-28		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table21: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-02/2024-04-12			—
Total cycles ..... :		10			—
Open circuits ..... :		☐ Yes ☒ No			P
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-04-12			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-04-12			—
Cemented joints .....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>12.9	No breakdown		x	P
Supplementary information: Size of module 3.11 [m²]					

Table 22: MST 55 - Cold conditioning					P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-16/2024-04-18			—
Temperature [℃] / Duration [h] ..... :		-40 / 48			—
MST 01: Visual inspection after Cold conditioning					—
Test Date [YYYY-MM-DD].....:		2024-04-18			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Cold conditioning					—
Test Date [YYYY-MM-DD].....:		2024-04-18			—
Cemented joints .....:		☐ Yes ☒ No			—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>12.9	No breakdown		x	P
Supplementary information: Size of module 3.11 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 23: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-25/2024-05-06		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2369		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE C					
Sample #	14-M4				—
Table 24: MST 54 - UV test					P
Front side					
Test Date [YYYY-MM-DD] start/end .....:		2024-03-12/2024-03-16			—
Module temperature [℃] .....:		60.8			—
Irradiation total [kWh/ m²] .....:		15.0			—
Open circuits .....:		☐ Yes	☒ No		P
Back side (only for bifacial modules)					
Test Date [YYYY-MM-DD] start/end .....:		2024-03-20/2024-03-24			—
Module temperature [℃] .....:		61.2			—
Irradiation total [kWh/ m²] .....:		15.0			—
Open circuits .....:		☐ Yes	☒ No		P
MST 01: Visual inspection after UV test					—
Test Date [YYYY-MM-DD].....:		2024-03-24			—
Findings ..... :		☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after UV test					—
Test Date [YYYY-MM-DD].....:		2024-03-24			—
Cemented joints.....:		☐ Yes	☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>12.9	No breakdown		x	P
Supplementary information: Size of module 3.11 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-01/2024-04-09			—
Total cycles .....:		50			—
Applied current [A] .....:		20.69 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		60			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-04-09			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-04-09			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>12.9	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 3.11 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-15/2024-04-25		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-25		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-25		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-25		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2337		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD].....:		2024-04-26		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] .....:		40		—
Applied force perpendicular to the mounting surface [N] .....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-26		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-26		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-26		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V] .....:		2 minutes of 2025		—
Solution resistivity [Ω cm] .....:		2358		—
Solution temperature [℃] .....:		22.9		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: 1. Size of module 3.11 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE D				
Sample #	14-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-07/2024-04-19		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-04-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-04-19		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-04-19		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2381		—
Solution temperature [℃] .....:		22.9		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-04-23		—
Mounting method ....:	Clamps mounting (4 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-23		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-23		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-04-23		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2321		—
Solution temperature [℃] .... :	23.0		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>12.9	P

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information: Size of module 3.11 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE E				
Sample #	14-M8			—
Table 30: MST 51 - Thermal cycling test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-11/2024-04-17		—
Total cycles .....:		200		—
Applied current [A] .....:		20.87 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages		—
Applied load [N] .....:		5		—
Limiting voltage [V] .....:		60		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-04-17		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-04-17		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-04-17		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2349		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE F					
Sample #	14-M11				—
Table 31: MST 25 - Bypass diode thermal test					P
Test Date [YYYY-MM-DD] start/end .....:	2024-02-21/2024-02-21				—
Module temperature [℃] .....:	75				—
Number of diodes in junction box.....:	3				—
Diode manufacturer .....:	Tongwei Solar (Hefei) Co., Ltd.				—
Diode type designation .....:	40SQ045				—
Max. permissible junction temperature T_{Jmax} [℃] (according to diode datasheet).....:	200				—
Step 1, Determination of V_D versus T_J characteristic					—
Diode	**1**				
Ambient temperature of the junction box [℃]....:	30 ± 2	50 ± 2	70 ± 2	90 ± 2	—
Pulsed current.....:	21.88	21.88	21.88	21.88	—
Voltage drop [V] .....:	0.5019	0.4763	0.4380	0.4119	—
V_D versus T_J characteristic .....:	V_D=0.5495 - 1.54 x 10^{-3} T_J				
Max. permissible junction temperature T_{Jmax} [℃] (according to diode datasheet)..... :	200				—
Diode	**2**				
Ambient temperature of the junction box [℃]....:	30 ± 2	50 ± 2	70 ± 2	90 ± 2	—
Pulsed current.....:	21.88	21.88	21.88	21.88	—
Voltage drop [V] .....:	0.4986	0.4705	0.4299	0.4087	—
V_D versus T_J characteristic .....:	V_D=0.5450 - 1.55 x 10^{-3} T_J				
Max. permissible junction temperature T_{Jmax} [℃] (according to diode datasheet)..... :	200				—
Diode	**3**				
Ambient temperature of the junction box [℃]....:	30 ± 2	50 ± 2	70 ± 2	90 ± 2	—
Pulsed current.....:	21.88	21.88	21.88	21.88	—
Voltage drop [V] .....:	0.4902	0.4750	0.4236	0.4049	—
V_D versus T_J characteristic .....:	V_D=0.5406 - 1.54 x 10^{-3} T_J				
Max. permissible junction temperature T_{Jmax} [℃] (according to diode datasheet)..... :	200				—
Step 2, Bypass diode thermal test					—
	Diode 1	Diode 2	Diode 3		Result
Current flow applied* [A].....:	21.88	21.88	21.88		—
Max. diode surface temperature allowed T_{Jmax} [℃],.....:	200	200	200		—

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Voltage drop [V] after 1h.....:	0.3652	0.3509	0.3574	—
Calculated max. junction temperature T_{Jcalc} [℃]:	119.7	125.2	119.0	—
$T_{Jcalc} < T_{Jmax}$ (test passed)? yes/no.....:	Yes	Yes	Yes	P
Current flow** (1.25 x Isc) [A] .....:	27.35	27.35	27.35	—
Bypass diode remain(s) functional (yes/no).....:	Yes	Yes	Yes	P
Supplementary information: See Table 43 for the test details of bypass diode functionality test. For bifacial modules, * current for the 1st hour shall be $I_{SC\text{-}aBSI}$, ** current for the 2nd hour shall be 1.25 x $I_{SC\text{-}aBSI}$.				
MST 01: Visual inspection after Bypass diode thermal test				—
Test Date [YYYY-MM-DD].....:	2024-04-26			—
Findings ..... :	☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Bypass diode thermal test				—
Test Date [YYYY-MM-DD].....:	2024-04-26			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied [V, DC] .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after Bypass diode thermal test				—
Test Date [YYYY-MM-DD]:.....	2024-04-26			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied [V]:.....	2 minutes of 1500			—
Solution resistivity [Ω cm] .....:	2382			—
Solution temperature [℃] .....:	22.7			—
Measured [MΩ]	Required [MΩ]			Result
>1000	>12.9			P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	14-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-03-11/2024-03-12	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle……......:	1255 W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	61.9/60.2	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	A01:136.2; C22: 129.8; D25: 132.7; E22: 130.2;	—
Shading rate [%] or number of cells shaded.....:	A01: 25; C22: 30; D25: 35; E22: 30	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-12	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-12	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
17.39	49.65	16.58	42.79	709.4	82.16

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-12	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-12	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	2280	—
Solution temperature [℃] .....:	22.1	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>12.9	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	11		12	…	19	20	21	22
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 3.11 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	14-M13			—
Table 32: MST 21 - Temperature Test				P
Reference solar irradiance (W/m²) .....:	1000 W/m²			—
Reference ambient temperature (℃) .....:	40			—
Module at MPP				
Measuring location:	Component temperature T_{OBS} (℃)	Normalized temperature T_{CON} (℃)	Component temperature limit (℃)	—
PV module frontsheet above the centre cell	75.2	74.3	Glass	—
PV module backsheet below the centre cell	74.1	73.2	Glass	—
Terminal enclosure interior surface	70.3	69.4	110	P
Field wiring terminals	71.0	70.1	110	P
Insulation of the field wiring leads	68.2	67.3	110	P
External connector bodies	67.9	67.0	105	P
Bypass diode bodies	69.5	68.6	200	P
MST 01: Visual inspection after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-04-01			—
Findings ..... :	☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-04-01			—
Cemented joints.....:	☐ Yes ☒ No			—
Test Voltage applied (V, DC) .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	×	P
MST 17: Wet leakage current test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-04-01			—
Cemented joints.....:	☐ Yes ☒ No			—
Test Voltage applied (V, dc) .....:	2 minutes of 1500			—
Solution resistivity (Ω cm) .....:	2328			—
Solution temperature (℃) .....:	22.7			—
Measured (MΩ)	Required (MΩ)			Result
>1000	>12.9			P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	14-M13			—
Table 34: MST 26 - Reverse current overload test				P
Test Date [YYYY-MM-DD] .....:		2024-04-12		—
Module over-current protection rating [A].....:		35		—
Test current [A].....:		47.25		—
Range of applied voltage [V] .....:		60.98/56.12		—
Test duration .....:		2 hours		—
Observations				Result
Maximum external module surface temperature during the test [℃] .....:		75.3		P
MST 01: Visual inspection after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-04-12		—
Findings..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-04-12		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-04-12		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm].....:		2338		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G			
Sample #:	14-M14		—
Table 35.2: MST 14 - Impulse voltage test			P
Test Date [YYYY-MM-DD] .....:		2024-03-19	—
Maximum system voltage [V] .....:		*1500*	—
Required Impulse voltage [V].....:		*18720*	—
Measured Impulse voltage [V] .....:		*18720*	P
T_1 [µs].....:		*1.2*	P
T_2 [µs].....:		*50*	P
Thickness of conductive foil [mm] .....:		0.05	—
Results			—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)			P
MST 01: Visual inspection after Impulse voltage test			—
Test Date [YYYY-MM-DD].....:		2024-03-19	—
Findings ..... :		☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos		No visual defects	—
MST 16: Insulation test after Impulse voltage test			—
Test Date [YYYY-MM-DD].....:		2024-03-19	—
Cemented joints..... :		☐ Yes ☒ No	—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000	—
Measured	Required	Dielectric breakdown	Result
MΩ	MΩ	Yes (description) / No	
>1000	>12.9	No breakdown / x	P
Supplementary information: Size of module 3.11 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

OTHER TESTS		
Sample #:	11-fire 1, 11-fire 2, 11-fire 3	—
Table 36: MST 23 - Fire test		P
Test Date [YYYY-MM-DD] .....:	2024-03-05	—
Module fire resistance class (A, B, C) .....:	C	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to Zhejiang Gather Uni. Please refer to annex 3 for detailed pictures after test.		

Sample #:	14-M16		—
Table 37: MST 24 - Ignitability test			P
Test Date [YYYY-MM-DD].....:	2024-03-08		—
Flame application point.....:	-		—
Surface exposure.....:	☒ Yes	☐ No	—
Backsheet foil exposure.....:	☐ Yes	☒ No	—
Frame adhesive exposure .....:	☒ Yes	☐ No	—
Edge exposure.....:	☒ Yes	☐ No	—
Junction box adhesive exposure.....:	☒ Yes	☐ No	—
Type label exposure .....:	☐ Yes	☒ No	—
Backrail adhesive exposure.....:	☐ Yes	☒ No	—
Ignition occurs .....:	☐ Yes	☒ No	—
Flame spread less as 150 mm	☒ Yes	☐ No	P
Length of destroyed area.....:	N/A		P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	14-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:	2024-03-04		—
Weight of impactor [kg] .....:	45.5		—
Thickness of sample [mm].....:	35		—
Mounting technique used.....:	Clamps mounting (4 points/long side with 2 beams across the module at the long sides)		—
Module breakage .....:	☒	No breakage	—
	☒	No separation from frame or mounting structure	—
	☐	Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
	☐	Breakage occurred, no particles larger than 65 cm ²ejected from sample	—
	☐	Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....::			2024-05-31 for 14-M2#; 2024-05-09 for 14-M3# 2024-04-30 for 14-M4#, 14-M6#, 14-M11# 2024-04-24 for 14-M8#; 2024-03-15 for 14-M12# 2024-04-12 for 14-M13#			—
Module temperature [℃]....::			25			—
Irradiance [W/m²]....::			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A)	Vmp [V]	Pmp [W]	FF [%]
14-M2	17.03	49.31	16.19	42.37	686.0	81.69
14-M3	17.12	49.49	16.30	42.38	690.8	81.53
14-M4	17.07	49.22	16.30	42.25	688.7	81.97
14-M6	17.13	49.20	16.32	42.31	690.5	81.93
14-M8	17.28	49.43	16.47	42.60	701.60	82.14
14-M11	17.33	49.52	16.51	42.65	704.2	82.06
14-M12	17.39	49.63	16.58	42.77	709.2	82.17
14-M13	17.38	49.85	16.59	42.77	709.6	81.90
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-05-31 for 14-M2#; 2024-05-09 for 14-M3# 2024-04-30 for 14-M4#, 14-M6#, 14-M10#, 14-M11# 2024-04-24 for 14-M8#; 2024-03-15 for 14-M12# 2024-04-12 for 14-M13#	—
Sample # 14-M2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M11	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 14-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings							P
Test Date [YYYY-MM-DD].....:		2024-05-31 for 14-M2#; 2024-05-09 for 14-M3# 2024-04-30 for 14-M4#, 14-M6#, 14-M10#, 14-M11# 2024-04-24 for 14-M8#; 2024-03-15 for 14-M12# 2024-04-12 for 14-M13#					—
Sample #	Markings legible		Not easily removable		No curling		Result
14-M2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M11	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 45: MST 06 - Sharp edge test					P
Test Date [YYYY-MM-DD].....:		2024-05-31 for 14-M2#; 2024-05-09 for 14-M3# 2024-04-30 for 14-M4#, 14-M6#, 14-M10#, 14-M11# 2024-04-24 for 14-M8#; 2024-03-15 for 14-M12# 2024-04-12 for 14-M13#			—
Sample #	The black indicating tape is visible through the resulting cut.				Result
14-M2	☒ Yes	☐ No			P
14-M3	☒ Yes	☐ No			P
14-M4	☒ Yes	☐ No			P
14-M6	☒ Yes	☐ No			P
14-M8	☒ Yes	☐ No			P
14-M10	☒ Yes	☐ No			P
14-M11	☒ Yes	☐ No			P
14-M12	☒ Yes	☐ No			P
14-M13	☒ Yes	☐ No			P
Supplementary information: N/A					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:		2024-05-31 for 14-M2#; 2024-05-09 for 14-M3# 2024-04-30 for 14-M4#, 14-M6#, 14-M10#, 14-M11# 2024-04-24 for 14-M8#; 2024-03-15 for 14-M12# 2024-04-12 for 14-M13#		—
☐ **Method A**				—
Ambient temperature [℃].....:		N/A		—
Current flow applied [A].....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
14-M2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M11	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
14-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMHF-66HD715 (BOM15)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-02-29	—
Sample # 15-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 15-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 15-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 15-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 15-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 15-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	15-M10						—
Test Date [YYYY-MM-DD] .....:	2024-03-20						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	17.98±5%						—
Rated V_{OC} including manufacturing tolerances..:	50.22±5%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	17.48	49.70	16.68	42.81	714.0	82.19	—
Rear	15.18	49.58	14.09	43.03	606.5	80.58	—
BNPI	19.45	49.96	18.50	42.97	795.0	81.81	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-03-20						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
15-M6	17.46	49.67	16.67	42.78	713.1	82.23	—
15-M8	17.44	49.62	16.63	42.82	712.1	82.29	—
15-M12	17.47	49.66	16.65	42.85	713.4	82.23	—
15-M13	17.49	49.77	16.68	42.89	715.4	82.18	—
15-M14	17.46	49.73	16.64	42.92	714.2	82.25	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-03-20		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
15-M6	>1000	>12.9	No breakdown	×	P
15-M8	>1000	>12.9	No breakdown	×	P
15-M10	>1000	>12.9	No breakdown	×	P
15-M12	>1000	>12.9	No breakdown	×	P
15-M13	>1000	>12.9	No breakdown	×	P
15-M14	>1000	>12.9	No breakdown	×	P
Supplementary information: Size of module 3.11 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-03-20	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		2349	—
Solution temperature [℃] .....:		22.3	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
15-M6	>1000	>12.9	P
15-M8	>1000	>12.9	P
15-M10	>1000	>12.9	P
15-M12	>1000	>12.9	P
15-M13	>1000	>12.9	P
Supplementary information: Size of module 3.11 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :	2024-03-20			—
Test Date **Final** examination [YYYY-MM-DD] ... :	2024-05-14 for 15-M6#; 2024-05-07 for 15-M8# 2024-03-31 for 15-M18#, 15-M19#, 15-M20#, 15-M21#			—
Maximum over-current protection rating [A]..... :	35			—
Current applied [A] ..... :	87.5			—
Location of designated grounding point ..... :	The ground hole of one longer side			—
Location of second contacting point ..... :	A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side			—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
15-M6	Initial examination	A: 0.095 B: 0.181 C: 0.183	A: 0.001 B: 0.002 C: 0.002	P
	Preconditioning: MST 53, MST 34			—
	Final examination	A: 0.355 B: 0.444 C: 0.356	A: 0.004 B: 0.005 C: 0.004	P
15-M8	Initial examination	A: 0.089 B: 0.091 C: 0.093	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 51			—
	Final examination	A: 0.614 B: 0.711 C: 0.707	A: 0.007 B: 0.008 C: 0.008	P
15-M18	Initial examination	A: 0.094 B: 0.179 C: 0.182	A: 0.001 B: 0.002 C: 0.002	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.708 B: 0.529 C: 0.531	A: 0.008 B: 0.006 C: 0.006	P
15-M19	Initial examination	A: 0.092 B: 0.095 C: 0.179	A: 0.001 B: 0.001 C: 0.002	P
	Preconditioning: MQT 21			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.443 B: 0.529 C: 0.709	A: 0.005 B: 0.006 C: 0.008	P
15-M20	Initial examination	A: 0.089 B: 0.091 C: 0.093	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.357 B: 0.356 C: 0.618	A: 0.004 B: 0.004 C: 0.007	P
15-M21	Initial examination	A: 0.094 B: 0.093 C: 0.090	A: 0.001 B: 0.002 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.528 B: 0.441 C: 0.617	A: 0.006 B: 0.005 C: 0.007	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-03-20	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-05-14 for 15-M6#; 2024-05-07 for 15-M8#	—
Sample #	Position in test sequence:		
15-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
15-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 51, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A		
Sample #	N/A	—
Table 13: MST 37 - Materials creep test		N/A
SEQUENCE B		
Table 14: MST 53 - Damp heat test		N/A
Table 15: MST 54 - UV test (front side)		N/A
Table 17: MST 54 - UV test (back side)		N/A
Table18: MST 52 - Humidity freeze test		N/A
SEQUENCE B1		
Sample #	N/A	—
Table 19: MST 55 - Cold conditioning		N/A
Table 20: MST 56 - Dry heat conditioning		N/A
Table21: MST 52 - Humidity freeze test		N/A
Table 22: MST 55 - Cold conditioning		N/A
Table 23: MST 52 - Humidity freeze test		N/A
SEQUENCE C		
Sample #	1 N/A	—
Table 24: MST 54 - UV test		N/A
Table 25: MST 51 - Thermal cycling test		N/A
Table 26: MST 52 - Humidity freeze test		N/A
Table 27: MST 42 - Robustness of terminations test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE D				
Sample #	15-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-27/2024-05-08		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-05-08		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-05-08		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-05-08		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2381		—
Solution temperature [℃] .....:		22.6		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-05-11		—
Mounting method ....:	Clamps mounting (4 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-05-11		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-05-11		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-05-11		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2308		—
Solution temperature [℃] .... :	22.2		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>12.9	P

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information: Size of module 3.11 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE E				
Sample #	15-M8			—
Table 30: MST 51 - Thermal cycling test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-25/2024-04-30		—
Total cycles .....:		200		—
Applied current [A] .....:		20.90 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages		—
Applied load [N] .....:		5		—
Limiting voltage [V] .....:		60		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2349		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	15-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-03-27/2024-03-28	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle…….....:	1255W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	60.7/58.9	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	F13: 141.0; C01: 135.7; E11: 129.8; A18: 138.0	—
Shading rate [%] or number of cells shaded.....:	F13: 30; C01: 25; E11: 35; A18: 40	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-28	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-28	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
17.41	49.57	16.58	42.75	708.8	82.13

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-28	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-28	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	2378	—
Solution temperature [℃] .....:	22.3	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>12.9	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	11		12	…	19	20	21	22
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 3.11 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	15-M13			—
Table 32: MST 21 - Temperature Test				P
Reference solar irradiance (W/m²) .....:	1000 W/m²			—
Reference ambient temperature (℃) .....:	40			—
Module at MPP				
Measuring location:	Component temperature T_{OBS} (℃)	Normalized temperature T_{CON} (℃)	Component temperature limit (℃)	—
PV module frontsheet above the centre cell	74.9	74.5	Glass	—
PV module backsheet below the centre cell	72.6	72.2	Glass	—
Terminal enclosure interior surface	68.7	68.3	110	P
Field wiring terminals	69.5	69.1	110	P
Insulation of the field wiring leads	66.9	66.4	110	P
External connector bodies	67.3	66.9	105	P
Bypass diode bodies	68.9	68.5	200	P
MST 01: Visual inspection after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-03-25			—
Findings ..... :	☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-03-25			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, DC) .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	×	P
MST 17: Wet leakage current test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-03-25			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, dc) .....:	2 minutes of 1500			—
Solution resistivity (Ω cm) .....:	2380			—
Solution temperature (℃) .....:	22.8			—
Measured (MΩ)	Required (MΩ)			Result
>1000	>12.9			P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	15-M13			—
Table 34: MST 26 - Reverse current overload test				P
Test Date [YYYY-MM-DD] .....:		2024-04-12		—
Module over-current protection rating [A].....:		35		—
Test current [A].....:		47.25		—
Range of applied voltage [V] .....:		60.98/56.12		—
Test duration .....:		2 hours		—
Observations				Result
Maximum external module surface temperature during the test [℃] .....:		73.5		P
MST 01: Visual inspection after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-04-12		—
Findings..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-04-12		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after Reverse current overload test				—
Test Date [YYYY-MM-DD].....:		2024-04-12		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm].....:		2338		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G				
Sample #:	15-M14			—
Table 35.2: MST 14 - Impulse voltage test				P
Test Date [YYYY-MM-DD] .....:		2024-03-29		—
Maximum system voltage [V] .....:		*1500*		—
Required Impulse voltage [V].....:		*18720*		—
Measured Impulse voltage [V] .....:		*18720*		P
T_1 [µs].....:		1.2		P
T_2 [µs].....:		50		P
Thickness of conductive foil [mm] .....:		0.05		—
Results				—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)				P
MST 01: Visual inspection after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-03-29		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-03-29		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

OTHER TESTS		
Sample #:	N/A	—
Table 36: MST 23 - Fire test		N/A

Sample #:	N/A	—
Table 37: MST 24 - Ignitability test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	N/A	—
Table 38: MST 32 - Module breakage test		N/A

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

Table 41: MST 12 - Cut susceptibility test	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....::			2024-05-14 for 15-M6#; 2024-05-07 for 15-M8# 2024-04-01 for 15-M12#; 2024-03-28 for 15-M13#			—
Module temperature [℃]....:			25			—
Irradiance [W/m²]....:			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A)	Vmp [V]	Pmp [W]	FF [%]
15-M6	17.23	49.18	16.39	42.16	691.0	81.55
15-M8	17.32	49.31	16.49	42.53	701.3	82.11
15-M12	17.40	49.58	16.58	42.73	708.4	80.22
15-M13	17.43	49.56	16.62	42.78	711.0	82.30
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-05-14 for 15-M6#, 15-M10# 2024-05-07 for 15-M8# 2024-04-01 for 15-M12#; 2024-03-28 for 15-M13#	—
Sample # 15-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 15-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 15-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 15-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 15-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings								P
Test Date [YYYY-MM-DD].....:		2024-05-14 for 15-M6#, 15-M10# 2024-05-07 for 15-M8# 2024-04-01 for 15-M12#; 2024-03-28 for 15-M13#						—
Sample #	Markings legible		Not easily removable		No curling			Result
15-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
15-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
15-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
15-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
15-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
Supplementary information: N/A								

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD].....:		2024-05-14 for 15-M6#, 15-M10# 2024-05-07 for 15-M8# 2024-04-01 for 15-M12#; 2024-03-28 for 15-M13#		—
Sample #	The black indicating tape is visible through the resulting cut.			Result
15-M6	☒ Yes	☐ No		P
15-M8	☒ Yes	☐ No		P
15-M10	☒ Yes	☐ No		P
15-M12	☒ Yes	☐ No		P
15-M13	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:	2024-05-14 for 15-M6#, 15-M10# 2024-05-07 for 15-M8# 2024-04-01 for 15-M12#; 2024-03-28 for 15-M13#			—
☐ **Method A**				—
Ambient temperature [℃].....:	N/A			—
Current flow applied [A].....:	N/A			—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—
Sample #	IV curve after shading			Result
	Diode 1 working properly	Diode 2 working properly	Diode 3 working properly	
15-M6	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
15-M8	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
15-M10	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
15-M12	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
15-M13	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	P
Supplementary information: N/A				

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD]..... :	N/A		—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD]..... :	N/A		—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMNF-66HD705 (BOM16)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-04-19	—
Sample # 13-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	13-M10						—
Test Date [YYYY-MM-DD] .....:	2024-04-19						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	18.40 ±5%						—
Rated V_{OC} including manufacturing tolerances..:	48.77 ±5%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	18.22	48.63	17.19	41.45	712.5	80.44	—
Rear	14.42	48.26	13.64	41.30	563.2	80.97	—
BNPI	20.18	48.80	19.09	41.34	788.9	80.13	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-04-19						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
13-M4	18.25	48.64	17.22	41.42	713.3	80.36	—
13-M6	18.24	48.65	17.21	41.50	714.3	80.51	—
13-M8	18.21	48.64	17.18	41.55	713.8	80.59	—
13-M12	18.25	48.65	17.21	41.42	712.9	80.28	—
13-M13	18.23	48.64	17.26	41.29	712.7	80.40	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-04-19		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
13-M4	>1000	>12.9	No breakdown	×	P
13-M6	>1000	>12.9	No breakdown	×	P
13-M8	>1000	>12.9	No breakdown	×	P
13-M10	>1000	>12.9	No breakdown	×	P
13-M12	>1000	>12.9	No breakdown	×	P
13-M13	>1000	>12.9	No breakdown	×	P
Supplementary information: Size of module 3.11 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-04-19	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		2242	—
Solution temperature [℃] .....:		22.2	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
13-M4	>1000	>12.9	P
13-M6	>1000	>12.9	P
13-M8	>1000	>12.9	P
13-M10	>1000	>12.9	P
13-M12	>1000	>12.9	P
13-M13	>1000	>12.9	P
Supplementary information: Size of module 3.11 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :		2024-04-19		—
Test Date **Final** examination [YYYY-MM-DD] ... :		2024-06-25		—
Maximum over-current protection rating [A]..... :		35		—
Current applied [A] ..... :		87.5		—
Location of designated grounding point ..... :		The ground hole of one longer side		—
Location of second contacting point..... :		A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side		—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
13-M4	Initial examination	N/A	A:0.0037 B:0.0027 C:0.0047	P
	Preconditioning: MST 54, MST 51, MST 52			—
	Final examination	N/A	A:0.0036 B:0.0028 C:0.0049	P
13-M6	Initial examination	N/A	A:0.0036 B:0.0028 C:0.0048	P
	Preconditioning: MST 53, MST 34,			—
	Final examination	N/A	A:0.0037 B:0.0029 C:0.0049	P
13-M8	Initial examination	N/A	A:0.0037 B:0.0028 C:0.0049	P
	Preconditioning: MST 51			—
	Final examination	N/A	A:0.0034 B:0.0026 C:0.0045	P
Supplementary information: Current of 100A is applied, higher than the required 87.5A.				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-04-19	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-06-25	—
Sample #	Position in test sequence:		
13-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
13-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
13-M8	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 51, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A		
Sample #	N/A	—
Table 13: MST 37 - Materials creep test		N/A

SEQUENCE B	
Table 14: MST 53 - Damp heat test	N/A

Table 15: MST 54 - UV test (front side)	N/A

Table 17: MST 54 - UV test (back side)	N/A

Table18: MST 52 - Humidity freeze test	N/A

SEQUENCE B1		
Sample #	N/A	—
Table 19: MST 55 - Cold conditioning		N/A

Table 20: MST 56 - Dry heat conditioning	N/A

Table21: MST 52 - Humidity freeze test	N/A

Table 22: MST 55 - Cold conditioning	N/A

Table 23: MST 52 - Humidity freeze test	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE C				
Sample #	13-M4			—
Table 24: MST 54 - UV test				P
Front side				
Test Date [YYYY-MM-DD] start/end .....:		2024-04-23/2024-04-28		—
Module temperature [℃] .....:		61.3/57.3		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
Back side (only for bifacial modules)				
Test Date [YYYY-MM-DD] start/end .....:		2024-05-06/2024-05-11		—
Module temperature [℃] .....:		60.3/57.8		—
Irradiation total [kWh/ m²] .....:		15.0		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD].....:		2024-05-11		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD].....:		2024-05-11		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-05-31/2024-06-07			—
Total cycles .....:		50			—
Applied current [A] .....:		20.18 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		80			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-06-07			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-06-07			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>12.9	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 3.11 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-06-12/2024-06-22		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-06-22		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-06-22		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-06-22		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2691		—
Solution temperature [℃] .....:		22.4		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD].....:		2024-06-24		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] .....:		40		—
Applied force perpendicular to the mounting surface [N] .....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-06-24		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-06-24		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-06-24		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V] .....:		2 minutes of 2025		—
Solution resistivity [Ω cm] .....:		1978		—
Solution temperature [℃] .....:		22.4		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: 1. Size of module 3.11 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE D				
Sample #	13-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-23/2024-06-07		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-06-07		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-06-07		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-06-07		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2614		—
Solution temperature [℃] .....:		21.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-06-17		—
Mounting method ....:	Clamps mounting (8 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-06-17		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-06-17		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-06-17		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2356		—
Solution temperature [℃] .... :	22.1		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>12.9	P

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information: Size of module 3.11 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE E				
Sample #	13-M8			—
Table 30: MST 51 - Thermal cycling test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-23/2024-05-23		—
Total cycles .....:		200		—
Applied current [A] .....:		20.18 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages		—
Applied load [N] .....:		5		—
Limiting voltage [V] .....:		60		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-23		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-23		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-05-23		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2354		—
Solution temperature [℃] .....:		22.1		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	13-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-06-17	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle…….....:	1200 W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	59.1/57.0	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	B1: 64.1; F22: 122.3; A22: 122.1; C13: 134.3	—
Shading rate [%] or number of cells shaded.....:	B1: 30; F22: 17; A22: 17; C13: 17	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-06-17	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-06-17	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
18.11	48.64	17.09	41.59	710.6	80.68

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-06-17	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-06-17	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	2179	—
Solution temperature [℃] .....:	22.1	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>12.9	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	11		12	…	19	20	21	22
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 3.11 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	13-M13			—
Table 32: MST 21 - Temperature Test				P
Reference solar irradiance (W/m²) .....:	1000 W/m²			—
Reference ambient temperature (℃) .....:	40			—
Module at MPP				
Measuring location:	Component temperature T_{OBS} (℃)	Normalized temperature T_{CON} (℃)	Component temperature limit (℃)	—
PV module frontsheet above the centre cell	74.0	76.0	Glass	—
PV module backsheet below the centre cell	71.4	73.4	Glass	—
Terminal enclosure interior surface	71.2	73.2	110	P
Field wiring terminals	78.5	80.5	110	P
Insulation of the field wiring leads	71.0	73.0	110	P
External connector bodies	72.0	74.0	105	P
Bypass diode bodies	79.2	81.2	200	P
MST 01: Visual inspection after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-06-17			—
Findings ..... :	☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-06-17			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, DC) .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	×	P
MST 17: Wet leakage current test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-06-17			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, dc) .....:	2 minutes of 1500			—
Solution resistivity (Ω cm) .....:	<3500			—
Solution temperature (℃) .....:	22.8			—
Measured (MΩ)		Required (MΩ)		Result
>1000		>12.9		P
Supplementary information: Size of module 3.11 [m²]				

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

Sample #	13-M13			—
Table 34: MST 26 - Reverse current overload test				P
Test Date [YYYY-MM-DD] ..... :		2024-06-24		—
Module over-current protection rating [A]..... :		35		—
Test current [A]..... :		54		—
Range of applied voltage [V] ..... :		58.92/54.05		—
Test duration ..... :		2 hours		—
Observations				Result
Maximum external module surface temperature during the test [℃] ..... :		105.6		P
MST 01: Visual inspection after Reverse current overload test				—
Test Date [YYYY-MM-DD] ..... :		2024-06-24		—
Findings..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Reverse current overload test				—
Test Date [YYYY-MM-DD] ..... :		2024-06-24		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>12.9	No breakdown	x	P
MST 17: Wet leakage current test after Reverse current overload test				—
Test Date [YYYY-MM-DD] ..... :		2024-06-24		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc]..... :		2 minutes of 1500		—
Solution resistivity [Ω cm]..... :		<3500		—
Solution temperature [℃] ..... :		22.3		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>12.9		P
Supplementary information: Size of module 3.11 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G		
Sample #:	N/A	—
Table 35.2: MST 14 - Impulse voltage test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

OTHER TESTS		
Sample #:	N/A	—
Table 36: MST 23 - Fire test		N/A

Sample #:	N/A	—
Table 37: MST 24 - Ignitability test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	N/A	—
Table 38: MST 32 - Module breakage test		N/A

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....: 2024-06-26 for 13-M4#, 13-M13# 2024-06-20 for 13-M6#, 13-M12# 2024-05-27 for 13-M8#						—
Module temperature [℃]....:			25			—
Irradiance [W/m²]....:			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
13-M4	18.08	48.01	17.13	40.49	693.3	79.86
13-M6	17.80	48.58	16.85	41.36	697.1	80.62
13-M8	18.21	48.63	17.26	40.42	697.7	78.79
13-M12	18.11	48.64	17.09	41.59	710.6	80.68
13-M13	18.07	48.71	17.10	41.66	712.5	80.97
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-06-26 for 13-M4#, 13-M10#, 13-M13# 2024-06-20 for 13-M6#, 13-M12# 2024-05-27 for 13-M8#	—
Sample # 13-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 13-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings								P
Test Date [YYYY-MM-DD].....:		2024-06-26 for 13-M4#, 13-M10#, 13-M13# 2024-06-20 for 13-M6#, 13-M12# 2024-05-27 for 13-M8#						—
Sample #	Markings legible		Not easily removable		No curling			Result
13-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
13-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
13-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
13-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
13-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
13-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
Supplementary information: N/A								

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD].....:		2024-06-26 for 13-M4#, 13-M10#, 13-M13# 2024-06-20 for 13-M6#, 13-M12# 2024-05-27 for 13-M8#		—
Sample #	The black indicating tape is visible through the resulting cut.			Result
13-M4	☒ Yes	☐ No		P
13-M6	☒ Yes	☐ No		P
13-M8	☒ Yes	☐ No		P
13-M10	☒ Yes	☐ No		P
13-M12	☒ Yes	☐ No		P
13-M13	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:	2024-06-26 for 13-M4#, 13-M10#, 13-M13# 2024-06-20 for 13-M6#, 13-M12# 2024-05-27 for 13-M8#			—
☐ **Method A**				—
Ambient temperature [℃].....:	N/A			—
Current flow applied [A].....:	N/A			—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
13-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
13-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMND-72HD575 (BOM20)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-03-07 for 20-M1#, 20-M2#, 20-M3#, 20-M4#, 20-M6#, 20-M12#, 20-M14# 2024-05-16 for 20-M8# 2024-07-06 for 20-M13#	—
Sample # 20-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample #	Findings .....:	☐ Yes ☒ No	P

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Clause	Requirement + Test	Result - Remark	Verdict
20-M15	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M16	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	20-M10						—
Test Date [YYYY-MM-DD] .....:	2024-03-14						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	15.88±5%						—
Rated V_{OC} including manufacturing tolerances..:	48.50±5%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	13.53	51.88	12.91	43.93	567.1	80.79	—
Rear	10.60	51.33	9.72	44.52	432.7	79.53	—
BNPI	14.95	52.06	14.15	44.19	625.3	80.34	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-03-14 for 20-M1#, 20-M2#, 20-M3#, 20-M4#, 20-M6#, 20-M12#, 20-M14# 2024-05-20 for 20-M8#; 2024-07-06 for 20-M13#						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
20-M1	13.53	51.75	12.94	43.89	567.9	81.11	—
20-M2	13.55	51.78	12.96	43.83	568.1	80.97	—
20-M3	13.49	51.70	12.90	43.88	566.0	81.15	—
20-M4	13.49	51.81	12.87	43.96	565.8	80.95	—
20-M6	13.52	51.85	12.89	43.93	566.3	80.78	—
20-M8	13.50	51.84	12.88	43.94	565.9	80.86	—
20-M12	13.48	51.80	12.90	43.96	566.9	81.21	—
20-M13	13.51	51.74	12.92	43.85	566.5	81.04	—
20-M14	13.54	51.75	12.94	43.86	567.6	81.01	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-03-14 for 20-M1#, 20-M2#, 20-M3#, 20-M4#, 20-M6#, 20-M12#, 20-M14# 2024-05-20 for 20-M8#; 2024-07-06 for 20-M13#		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
20-M1	>1000	>15.5	No breakdown	×	P
20-M2	>1000	>15.5	No breakdown	×	P
20-M3	>1000	>15.5	No breakdown	×	P
20-M4	>1000	>15.5	No breakdown	×	P
20-M6	>1000	>15.5	No breakdown	×	P
20-M8	>1000	>15.5	No breakdown	×	P
20-M10	>1000	>15.5	No breakdown	×	P
20-M12	>1000	>15.5	No breakdown	×	P
20-M13	>1000	>15.5	No breakdown	×	P
20-M14	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-03-14 for 20-M1#, 20-M2#, 20-M3#, 20-M4#, 20-M6#, 20-M12# 2024-05-20 for 20-M8#; 2024-07-06 for 20-M13#	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		< 3500	—
Solution temperature [℃] .....:		22±2	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
20-M1	>1000	>15.5	P
20-M2	>1000	>15.5	P
20-M3	>1000	>15.5	P
20-M4	>1000	>15.5	P
20-M6	>1000	>15.5	P
20-M8	>1000	>15.5	P
20-M10	>1000	>15.5	P
20-M12	>1000	>15.5	P
20-M13	>1000	>15.5	P
Supplementary information: Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :	2024-03-14 for 20-M1#, 20-M2#, 20-M3#, 20-M4#, 20-M6#, 20-M15# 2024-05-20 for 20-M8# 2024-03-25 for 20-M18#, 20-M19#, 20-M20#, 20-M21#			—
Test Date **Final** examination [YYYY-MM-DD] ... :	2024-03-27 for 20-M1#; 2024-06-04 for 20-M2# 2024-05-07 for 20-M3#,20-M6# 2024-06-27 for 20-M8# 2024-05-10 for 20-M4#; 2024-03-19 for 20-M15# 2024-04-01 for 20-M18#, 20-M19#, 20-M20#, 20-M21#			—
Maximum over-current protection rating [A]..... :	30			—
Current applied [A] ..... :	75			—
Location of designated grounding point ..... :	The ground hole of one longer side			—
Location of second contacting point..... :	A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side			—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
20-M1	Initial examination	A: 0.074 B: 0.068 C: 0.072	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 37			—
	Final examination	A: 0.131 B: 0.234 C: 0.229	A: 0.002 B: 0.003 C: 0.003	P
20-M2	Initial examination	A: 0.075 B: 0.074 C: 0.128	A: 0.001 B: 0.001 C: 0.002	P
	Preconditioning: MST 53, MST 54, MST 52， MST 54, MST 52			—
	Final examination	A: 0.462 B: 0.609 C: 0.530	A: 0.006 B: 0.008 C: 0.007	P
20-M3	Initial examination	A: 0.130 B: 0.074 C: 0.072	A: 0.002 B: 0.001 C: 0.001	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.616 B: 0.459 C: 0.312	A: 0.008 B: 0.006 C: 0.004	P
20-M4	Initial examination	A: 0.076 B: 0.077 C: 0.079	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 54, MST 51, MST 52			—
	Final examination	A: 0.534 B: 0.462 C: 0.684	A: 0.007 B: 0.006 C: 0.009	P
20-M6	Initial examination	A: 0.069 B: 0.071 C: 0.075	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 34,			—
	Final examination	A: 0.383 B: 0.529 C: 0.612	A: 0.005 B: 0.007 C: 0.008	P
20-M8	Initial examination	A: 0.075 B: 0.079 C: 0.069	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 51			—
	Final examination	A: 0.311 B: 0.235 C: 0.075	A: 0.004 B: 0.003 C: 0.001	P
20-M15	Initial examination	A: 0.069 B: 0.074 C: 0.072	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 32			—
	Final examination	A: 0.768 B: 0.687 C: 0.921	A: 0.010 B: 0.009 C: 0.012	P
20-M18	Initial examination	A: 0.075 B: 0.079 C: 0.080	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.082 B: 0.084 C: 0.081	A: 0.001 B: 0.001 C: 0.001	P

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Clause	Requirement + Test	Result - Remark		Verdict
20-M19	Initial examination	A: 0.067 B: 0.071 C: 0.069	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.133 B: 0.219 C: 0.130	A: 0.002 B: 0.003 C: 0.002	P
20-M20	Initial examination	A: 0.078 B: 0.077 C: 0.069	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.080 B: 0.079 C: 0.082	A: 0.001 B: 0.001 C: 0.001	P
20-M21	Initial examination	A: 0.127 B: 0.122 C: 0.076	A: 0.002 B: 0.002 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.235 B: 0.136 C: 0.231	A: 0.003 B: 0.002 C: 0.003	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-03-14 for 20-M1#, 20-M2#, 20-M3#, 20-M4#, 20-M6# 2024-05-20 for 20-M8#	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-03-27 for 20-M1#; 2024-06-04 for 20-M2# 2024-05-07 for 20-M3#,20-M6#; 2024-06-27 for 20-M8# 2024-05-10 for 20-M4#	—
Sample #	Position in test sequence:		
20-M1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 37, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
20-M2	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
20-M3	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
20-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
20-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
20-M8	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 51, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A				
Sample #	20-M1			—
Table 13: MST 37 - Materials creep test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-18/2024-03-27		—
Duration [h] .....:		200		—
Applied temperature [℃] .....:		105 ± 5		—
MST 01: Visual inspection after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-03-27		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
Supplementary information: For clearance and creepage distances see table 1.				
MST 16: Insulation test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-03-27		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-03-27		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied (V, dc) .....:		2 minutes of 1500		—
Solution resistivity (Ω cm) .....:		2289		—
Solution temperature (℃).....:		22.0		—
Measured(MΩ)		Required (MΩ)		Result
>1000		>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B					
Table 14: MST 53 - Damp heat test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-03-18/2024-03-27		—
Applied load [N] .....:			N/A		—
Duration [h] .....:			200		—
Sample #	—				—
20-M2	—				—
MST 01: Visual inspection after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-03-27		—
Sample # 20-M2	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-03-27		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
20-M2	>1000	>15.5	No breakdown	×	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 2.58 [m²]					

Table 15: MST 54 - UV test (front side)			P
Sample #	20-M2		—
Test Date [YYYY-MM-DD] start/end .....:		2024-03-30/2024-04-13	—
Module temperature [℃] .....:		60.0	—
Irradiation total [kWh/m²] .....:		60.0	—
Open circuits .....:		☐ Yes ☒ No	P
MST 01: Visual inspection after UV test			—
Test Date [YYYY-MM-DD].....:		2024-04-13	—
Findings ..... :		☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos		No visual defects	—
MST 16: Insulation test after UV test			—
Test Date [YYYY-MM-DD].....:		2024-04-13	—

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Clause	Requirement + Test	Result - Remark	Verdict

Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 2.58 [m²]				

Table16: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end ..... :		2024-04-17/2024-04-27		—
Total cycles ..... :		10		—
Open circuits ..... :		☐ Yes ☒ No		P
Sample #	—			—
20-M2	—			—
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD]..... :		2024-04-27		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD]..... :		2024-04-27		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown	Result
	MΩ	MΩ	Yes (description)	No
20-M2	>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test				—
Test Date [YYYY-MM-DD]..... :		2024-04-27		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc]..... :		2 minutes of 1500		—
Solution resistivity [Ω cm) ..... :		2352		—
Solution temperature [℃] ..... :		22.7		—
Sample #	Measured (MΩ)	Required (MΩ)		Result
20-M2	>1000	>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 17: MST 54 - UV test (back side)					P
Sample #	20-M2				—
Test Date [YYYY-MM-DD] start/end .....:		2024-04-30/2024-05-14			—
Module temperature [℃] .....:		60.0			—
Irradiation total [kWh/m²] .....:		60.0			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after UV test					—
Test Date [YYYY-MM-DD].....:		2024-05-14			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after UV test					—
Test Date [YYYY-MM-DD].....:		2024-05-14			—
Cemented joints .....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)	No		
>1000	>15.5	No breakdown	x		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 2.58 [m²]					

Table18: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-05-20/2024-05-30		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
Sample #	—			—
20-M2	—			—
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-30		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-30		—
Cemented joints .....:		☐ Yes ☒ No		—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
20-M2	>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test					—
Test Date [YYYY-MM-DD].....:			2024-05-30		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:			2 minutes of 1500		—
Solution resistivity [Ω cm) .....:			2309		—
Solution temperature [℃] .....:			23.1		—
Sample #	Measured (MΩ)		Required (MΩ)		Result
20-M2	>1000		>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 2.58 [m²]					

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

SEQUENCE B1				
Sample #	20-M3			—
Table 19: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-15/2024-03-17		—
Temperature [℃] Duration [h] .....:		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-17		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-17		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 20: MST 56 - Dry heat conditioning			P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-21/2024-03-30	—
Temperature [℃] Duration [h] ..... :		105 ± 5 / 200	—
MST 01: Visual inspection after Dry heat conditioning			—
Test Date [YYYY-MM-DD].....:		2024-03-30	—
Findings ..... :		☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos		No visual defects	—
MST 16: Insulation test after Dry heat conditioning			—
Test Date [YYYY-MM-DD].....:		2024-03-30	—
Cemented joints .....:		☐ Yes ☒ No	—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000	—
Measured	Required	Dielectric breakdown	Result
MΩ	MΩ	Yes (description)	No
>1000	>15.5	No breakdown	x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]			

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

Table21: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-02/2024-04-12		—
Total cycles ..... :		10		—
Open circuits ..... :		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-12		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-12		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 22: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-16/2024-04-18		—
Temperature [℃] / Duration [h] ..... :		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-04-18		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-04-18		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 23: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-23/2024-05-02		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-02		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-02		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-02		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2319		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE C					
Sample #	20-M4				—
Table 24: MST 54 - UV test					P
Front side					
Test Date [YYYY-MM-DD] start/end .....:		2024-03-19/2024-03-23			—
Module temperature [℃] .....:		60.8			—
Irradiation total [kWh/ m²] .....:		15.0			—
Open circuits .....:		☐ Yes	☒ No		P
Back side (only for bifacial modules)					
Test Date [YYYY-MM-DD] start/end .....:		2024-03-27/2024-03-31			—
Module temperature [℃] .....:		61.2			—
Irradiation total [kWh/ m²] .....:		15.0			—
Open circuits .....:		☐ Yes	☒ No		P
MST 01: Visual inspection after UV test					—
Test Date [YYYY-MM-DD].....:		2024-03-31			—
Findings ..... :		☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after UV test					—
Test Date [YYYY-MM-DD].....:		2024-03-31			—
Cemented joints.....:		☐ Yes	☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-09/2024-04-18			—
Total cycles .....:		50			—
Applied current [A] .....:		15.74 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		60			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-04-18			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-04-18			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-22/2024-05-02		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-02		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-02		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-05-02		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2370		—
Solution temperature [℃] .....:		22.9		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD].....:		2024-05-06		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] .....:		40		—
Applied force perpendicular to the mounting surface [N] .....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V] .....:		2 minutes of 2025		—
Solution resistivity [Ω cm] .....:		2350		—
Solution temperature [℃] .....:		23.0		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: 1. Size of module 2.58 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE D				
Sample #	20-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-18/2024-04-30		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2381		—
Solution temperature [℃] .....:		22.9		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-07-06		—
Mounting method ....:	Clamps mounting (4 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-07-06		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-07-06		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-07-06		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2378		—
Solution temperature [℃] .... :	23.2		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information: Size of module 2.58 [m²]			
SEQUENCE E			
Sample #	20-M8		—
Table 30: MST 51 - Thermal cycling test			P
Test Date [YYYY-MM-DD] start/end .....:	2024-05-21/2024-06-26		—
Total cycles .....:	200		—
Applied current [A] .....:	15.83 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages		—
Applied load [N] .....:	5		—
Limiting voltage [V] .....:	60		—
Open circuits .....:	☐ Yes ☒ No		P
MST 01: Visual inspection after Thermal cycling test			—
Test Date [YYYY-MM-DD].....:	2024-06-26		—
Findings ..... :	☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Thermal cycling test			—
Test Date [YYYY-MM-DD].....:	2024-06-26		—
Cemented joints.....:	☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:	2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown	Result
MΩ	MΩ	Yes (description) / No	
>1000	>15.5	No breakdown / x	P
MST 17: Wet leakage current test after Thermal cycling test			—
Test Date [YYYY-MM-DD].....:	2024-06-26		—
Cemented joints.....:	☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:	2 minutes of 1500		—
Solution resistivity [Ω cm] .....:	2349		—
Solution temperature [℃] .....:	23.4		—
Measured [MΩ]	Required [MΩ]		Result
>1000	>15.5		P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.58 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	20-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-03-18/2024-03-19	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle……......:	1233 W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	61.5/58.2	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	D01: 138.7; A13: 134.0; C22: 142.5; D05: 136.4	—
Shading rate [%] or number of cells shaded.....:	D01: 20; A13: 15; C22: 25; D05: 20	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-19	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-19	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
13.42	51.69	12.84	43.84	562.9	81.15

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-19	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-19	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	2280	—
Solution temperature [℃] .....:	21.2	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	12		13	…	21	22	23	24
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 2.58 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	20-M13			—
Table 32: MST 21 - Temperature Test				P
Reference solar irradiance (W/m²) .....:	1000 W/m²			—
Reference ambient temperature (℃) .....:	40			—
Module at MPP				
Measuring location:	Component temperature T_{OBS} (℃)	Normalized temperature T_{CON} (℃)	Component temperature limit (℃)	—
PV module frontsheet above the centre cell	74.3	73.4	Glass	—
PV module backsheet below the centre cell	72.9	72.0	Glass	—
Terminal enclosure interior surface	70.1	69.2	110	P
Field wiring terminals	70.5	69.6	110	P
Insulation of the field wiring leads	68.4	67.5	110	P
External connector bodies	67.9	67.0	105	P
Bypass diode bodies	69.2	68.3	200	P
MST 01: Visual inspection after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-07-06			—
Findings ..... :	☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-07-06			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, DC) .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-07-06			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, dc) .....:	2 minutes of 1500			—
Solution resistivity (Ω cm) .....:	2357			—
Solution temperature (℃) .....:	23.0			—
Measured (MΩ)		Required (MΩ)		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	20-M13			—
Table 34: MST 26 - Reverse current overload test				P
Test Date [YYYY-MM-DD] ..... :		2024-07-07		—
Module over-current protection rating [A]..... :		30		—
Test current [A]..... :		40.5		—
Range of applied voltage [V] ..... :		59.72/54.80		—
Test duration ..... :		2 hours		—
Observations				Result
Maximum external module surface temperature during the test [℃] ..... :		75.3		P
MST 01: Visual inspection after Reverse current overload test				—
Test Date [YYYY-MM-DD]..... :		2024-07-07		—
Findings..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Reverse current overload test				—
Test Date [YYYY-MM-DD]..... :		2024-07-07		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after Reverse current overload test				—
Test Date [YYYY-MM-DD]..... :		2024-07-07		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc]..... :		2 minutes of 1500		—
Solution resistivity [Ω cm]..... :		2370		—
Solution temperature [℃] ..... :		23.2		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G				
Sample #:	20-M14			—
Table 35.2: MST 14 - Impulse voltage test				P
Test Date [YYYY-MM-DD] .....:		2024-03-20		—
Maximum system voltage [V] .....:		*1500*		—
Required Impulse voltage [V].....:		*18720*		—
Measured Impulse voltage [V] .....:		*18720*		P
T_1 [µs].....:		*1.2*		P
T_2 [µs].....:		*50*		P
Thickness of conductive foil [mm] .....:		0.05		—
Results				—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)				P
MST 01: Visual inspection after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-03-20		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-03-20		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

OTHER TESTS		
Sample #:	20-fire 1, 20-fire 2, 20-fire 3	—
Table 36: MST 23 - Fire test		P
Test Date [YYYY-MM-DD] .....:	2024-03-29	—
Module fire resistance class (A, B, C) .....:	C	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to Zhejiang Gather Uni. Please refer to annex 3 for detailed pictures after test.		

Sample #:	20-M16		—
Table 37: MST 24 - Ignitability test			P
Test Date [YYYY-MM-DD].....:	2024-03-22		—
Flame application point.....:	-		—
Surface exposure.....:	☒ Yes	☐ No	—
Backsheet foil exposure.....:	☐ Yes	☒ No	—
Frame adhesive exposure .....:	☒ Yes	☐ No	—
Edge exposure.....:	☒ Yes	☐ No	—
Junction box adhesive exposure.....:	☒ Yes	☐ No	—
Type label exposure .....:	☐ Yes	☒ No	—
Backrail adhesive exposure.....:	☐ Yes	☒ No	—
Ignition occurs .....:	☐ Yes	☒ No	—
Flame spread less as 150 mm	☒ Yes	☐ No	P
Length of destroyed area.....:	N/A		P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	20-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:	2024-03-18		—
Weight of impactor [kg] .....:	45.5		—
Thickness of sample [mm].....:	30		—
Mounting technique used.....:	Clamps mounting (4 points/long side with 2 beams across the module at the long sides)		—
Module breakage .....:	☒	No breakage	—
	☒	No separation from frame or mounting structure	—
	☐	Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
	☐	Breakage occurred, no particles larger than 65 cm ²ejected from sample	—
	☐	Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....::			2024-06-04 for 20-M2#; 2024-05-07 for 20-M3#; 2024-05-10 for 20-M4#; 2024-05-07 for 20-M6# 2024-06-27 for 20-M8#; 2024-03-22 for 20-M12# 2024-07-07 for 20-M13#			—
Module temperature [℃]....::			25			—
Irradiance [W/m²]....::			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A)	Vmp [V]	Pmp [W]	FF [%]
20-M2	13.18	51.29	12.57	43.32	544.5	80.55
20-M3	13.16	51.20	12.56	43.37	544.7	80.84
20-M4	13.25	51.35	12.62	43.48	548.7	80.65
20-M6	13.34	51.56	12.70	43.61	553.8	80.52
20-M8	13.39	51.67	12.77	43.76	558.8	80.77
20-M12	13.41	51.70	12.84	43.82	562.6	81.15
20-M13	13.45	51.58	12.84	43.67	560.7	80.83
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-06-04 for 20-M2#; 2024-05-07 for 20-M3#; 2024-05-10 for 20-M4#; 2024-05-07 for 20-M6# 2024-06-27 for 20-M8#, 20-M10# 2024-03-22 for 20-M12#; 2024-07-07 for 20-M13#	—
Sample # 20-M2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M11	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 20-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings							P
Test Date [YYYY-MM-DD].....:		2024-06-04 for 20-M2#; 2024-05-07 for 20-M3#; 2024-05-10 for 20-M4#; 2024-05-07 for 20-M6# 2024-06-27 for 20-M8#, 20-M10# 2024-03-22 for 20-M12#; 2024-07-07 for 20-M13#					—
Sample #	Markings legible		Not easily removable		No curling		Result
20-M2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD].....:		2024-06-04 for 20-M2#; 2024-05-07 for 20-M3#; 2024-05-10 for 20-M4#; 2024-05-07 for 20-M6# 2024-06-27 for 20-M8#, 20-M10# 2024-03-22 for 20-M12#; 2024-07-07 for 20-M13#		—
Sample #	The black indicating tape is visible through the resulting cut.			Result
20-M2	☒ Yes	☐ No		P
20-M3	☒ Yes	☐ No		P
20-M4	☒ Yes	☐ No		P
20-M6	☒ Yes	☐ No		P
20-M8	☒ Yes	☐ No		P
20-M10	☒ Yes	☐ No		P
20-M12	☒ Yes	☐ No		P
20-M13	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:		2024-06-04 for 20-M2#; 2024-05-07 for 20-M3#; 2024-05-10 for 20-M4#; 2024-05-07 for 20-M6# 2024-06-27 for 20-M8#, 20-M10# 2024-03-22 for 20-M12#; 2024-07-07 for 20-M13#		—
☐ **Method A**				—
Ambient temperature [℃].....:		N/A		—
Current flow applied [A].....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
20-M2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
20-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMND-72HD575 (BOM21)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-02-26 for 21-M1#, 21-M2#, 21-M3#, 21-M4#, 21-M6#, 21-M12#, 21-M14# 2024-05-16 for 21-M8# 2024-07-06 for 21-M13#	—
Sample # 21-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—

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Clause	Requirement + Test	Result - Remark	Verdict
Sample # 21-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M16	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	21-M10						—
Test Date [YYYY-MM-DD] .....:	2024-03-04						—
Irradiance [W/m²] .....:	1000 or G_{BNPI}						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:	13.80±3%						—
Rated V_{OC} including manufacturing tolerances..:	52.10±3%						—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	13.52	51.78	12.84	44.03	565.4	80.76	—
Rear	10.63	51.42	9.79	44.44	435.1	79.60	—
BNPI	14.91	51.97	14.11	44.21	623.7	80.50	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-02-28 for 21-M1#, 21-M2#, 21-M3#, 21-M14# 2024-03-04 for 21-M4#, 21-M6#, 21-M12# 2024-05-20 for 21-M8#; 2024-07-06 for 21-M13#						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
21-M1	13.53	51.80	12.84	44.14	566.8	80.87	—
21-M2	13.56	51.85	12.86	44.11	567.2	80.67	—
21-M3	13.57	51.87	12.88	44.10	568.0	80.70	—
21-M4	13.54	51.80	12.88	43.97	566.3	80.74	—
21-M6	13.54	51.78	12.85	44.04	565.9	80.72	—
21-M8	13.54	51.83	12.86	44.04	566.4	80.71	—
21-M12	13.49	51.76	12.82	44.05	564.7	80.87	—
21-M13	13.56	51.86	12.87	44.12	567.8	80.74	—
21-M14	13.54	51.79	12.83	44.17	566.7	80.81	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-02-28 for 21-M1#, 21-M2#, 21-M3#, 21-M14# 2024-03-04 for 21-M4#, 21-M6#, 21-M12# 2024-05-20 for 21-M8#; 2024-07-06 for 21-M13#		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
21-M1	>1000	>15.5	No breakdown	×	P
21-M2	>1000	>15.5	No breakdown	×	P
21-M3	>1000	>15.5	No breakdown	×	P
21-M4	>1000	>15.5	No breakdown	×	P
21-M6	>1000	>15.5	No breakdown	×	P
21-M8	>1000	>15.5	No breakdown	×	P
21-M10	>1000	>15.5	No breakdown	×	P
21-M12	>1000	>15.5	No breakdown	×	P
21-M13	>1000	>15.5	No breakdown	×	P
21-M14	>1000	>15.5	No breakdown	×	P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-02-28 for 21-M1#, 21-M2#, 21-M3# 2024-03-04 for 21-M4#, 21-M6#, 21-M12# 2024-05-20 for 21-M8#; 2024-07-06 for 21-M13#	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		< 3500	—
Solution temperature [℃] .....:		22±2	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
21-M1	>1000	>15.5	P
21-M2	>1000	>15.5	P
21-M3	>1000	>15.5	P
21-M4	>1000	>15.5	P
21-M6	>1000	>15.5	P
21-M8	>1000	>15.5	P
21-M10	>1000	>15.5	P
21-M12	>1000	>15.5	P
21-M13	>1000	>15.5	P
Supplementary information: Size of module 2.58 [m^2]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :	2024-02-28 for 21-M1#, 21-M2#, 21-M3#, 21-M15# 2024-03-04 for 21-M4#, 21-M6# 2024-05-20 for 21-M8# 2024-03-25 for 21-M18#, 21-M19#, 21-M20#, 21-M21#			—
Test Date **Final** examination [YYYY-MM-DD] ... :	2024-03-27 for 21-M1#; 2024-05-14 for 21-M2# 2024-04-22 for 21-M3#; 2024-05-07 for 21-M6# 2024-06-27 for 21-M8# 2024-04-24 for 21-M4#; 2024-03-02 for 21-M15# 2024-04-01 for 21-M18#, 21-M19#, 21-M20#, 21-M21#			—
Maximum over-current protection rating [A]..... :	30			—
Current applied [A] ..... :	75			—
Location of designated grounding point ..... :	The ground hole of one longer side			—
Location of second contacting point ..... :	A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side			—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
21-M1	Initial examination	A: 0.074 B: 0.068 C: 0.072	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 37			—
	Final examination	A: 0.131 B: 0.234 C: 0.229	A: 0.002 B: 0.003 C: 0.003	P
21-M2	Initial examination	A: 0.075 B: 0.074 C: 0.128	A: 0.001 B: 0.001 C: 0.002	P
	Preconditioning: MST 53, MST 54, MST 52， MST 54, MST 52			—
	Final examination	A: 0.462 B: 0.609 C: 0.530	A: 0.006 B: 0.008 C: 0.007	P
21-M3	Initial examination	A: 0.130 B: 0.074 C: 0.072	A: 0.002 B: 0.001 C: 0.001	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52			—

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Clause	Requirement + Test	Result - Remark		Verdict
	Final examination	A: 0.616 B: 0.459 C: 0.312	A: 0.008 B: 0.006 C: 0.004	P
21-M4	Initial examination	A: 0.076 B: 0.077 C: 0.079	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 54, MST 51, MST 52			—
	Final examination	A: 0.534 B: 0.462 C: 0.684	A: 0.007 B: 0.006 C: 0.009	P
21-M6	Initial examination	A: 0.069 B: 0.071 C: 0.075	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 53, MST 34,			—
	Final examination	A: 0.383 B: 0.529 C: 0.612	A: 0.005 B: 0.007 C: 0.008	P
21-M8	Initial examination	A: 0.075 B: 0.079 C: 0.069	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 51			—
	Final examination	A: 0.311 B: 0.235 C: 0.075	A: 0.004 B: 0.003 C: 0.001	P
21-M15	Initial examination	A: 0.069 B: 0.074 C: 0.072	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MST 32			—
	Final examination	A: 0.768 B: 0.687 C: 0.921	A: 0.010 B: 0.009 C: 0.012	P
21-M18	Initial examination	A: 0.075 B: 0.079 C: 0.080	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.082 B: 0.084 C: 0.081	A: 0.001 B: 0.001 C: 0.001	P

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Clause	Requirement + Test	Result - Remark		Verdict
21-M19	Initial examination	A: 0.067 B: 0.071 C: 0.069	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.133 B: 0.219 C: 0.130	A: 0.002 B: 0.003 C: 0.002	P
21-M20	Initial examination	A: 0.078 B: 0.077 C: 0.069	A: 0.001 B: 0.001 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.080 B: 0.079 C: 0.082	A: 0.001 B: 0.001 C: 0.001	P
21-M21	Initial examination	A: 0.127 B: 0.122 C: 0.076	A: 0.002 B: 0.002 C: 0.001	P
	Preconditioning: MQT 21			—
	Final examination	A: 0.235 B: 0.136 C: 0.231	A: 0.003 B: 0.002 C: 0.003	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-02-28 for 21-M1#, 21-M2#, 21-M3# 2024-03-04 for 21-M4#, 21-M6# 2024-05-20 for 21-M8#	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-03-27 for 21-M1#; 2024-05-14 for 21-M2# 2024-04-22 for 21-M3#; 2024-05-07 for 21-M6# 2024-06-27 for 21-M8# 2024-04-24 for 21-M4#	—
Sample #	Position in test sequence:		
21-M1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 37, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
21-M2	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 54, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
21-M3	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
21-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
21-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
21-M8	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 51, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A				
Sample #	21-M1			—
Table 13: MST 37 - Materials creep test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-18/2024-03-27		—
Duration [h] .....:		200		—
Applied temperature [℃] .....:		105 ± 5		—
MST 01: Visual inspection after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-03-27		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
Supplementary information: For clearance and creepage distances see table 1.				
MST 16: Insulation test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-03-27		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-03-27		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied (V, dc) .....:		2 minutes of 1500		—
Solution resistivity (Ω cm) .....:		2289		—
Solution temperature (℃).....:		21.3		—
Measured(MΩ)		Required (MΩ)		Result
>1000		>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B					
Table 14: MST 53 - Damp heat test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-03-01/2024-03-10		—
Applied load [N] .....:			N/A		—
Duration [h] .....:			200		—
Sample #			—		—
21-M2			—		—
MST 01: Visual inspection after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-03-10		—
Sample # 21-M2	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-03-10		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
21-M2	>1000	>15.5	No breakdown	×	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 2.58 [m²]					

Table 15: MST 54 - UV test (front side)			P
Sample #	21-M2		—
Test Date [YYYY-MM-DD] start/end .....:		2024-03-12/2024-03-26	—
Module temperature [℃] .....:		60.0	—
Irradiation total [kWh/m²] .....:		60.0	—
Open circuits .....:		☐ Yes ☒ No	P
MST 01: Visual inspection after UV test			—
Test Date [YYYY-MM-DD].....:		2024-03-26	—
Findings ..... :		☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos		No visual defects	—
MST 16: Insulation test after UV test			—
Test Date [YYYY-MM-DD].....:		2024-03-26	—

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Clause	Requirement + Test	Result - Remark	Verdict

Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 2.58 [m²]				

Table16: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end ..... :		2024-03-29/2024-04-08		—
Total cycles ..... :		10		—
Open circuits ..... :		☐ Yes ☒ No		P
Sample #	—			—
21-M2	—			—
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD]..... :		2024-04-08		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD]..... :		2024-04-08		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown	Result
	MΩ	MΩ	Yes (description)	No
21-M2	>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test				—
Test Date [YYYY-MM-DD]..... :		2024-04-08		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc]..... :		2 minutes of 1500		—
Solution resistivity [Ω cm) ..... :		2352		—
Solution temperature [℃] ..... :		22.7		—
Sample #	Measured (MΩ)	Required (MΩ)		Result
21-M2	>1000	>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 17: MST 54 - UV test (back side)					P
Sample #	21-M2				—
Test Date [YYYY-MM-DD] start/end .....:		2024-04-11/2024-04-25			—
Module temperature [℃] .....:		60.0			—
Irradiation total [kWh/m²] .....:		60.0			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after UV test					—
Test Date [YYYY-MM-DD].....:		2024-04-25			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after UV test					—
Test Date [YYYY-MM-DD].....:		2024-04-25			—
Cemented joints .....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 2.58 [m²]					

Table18: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-29/2024-05-09			—
Total cycles .....:		10			—
Open circuits .....:		☐ Yes ☒ No			P
Sample #	—				—
21-M2	—				—
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-05-09			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-05-09			—
Cemented joints .....:		☐ Yes ☒ No			—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
21-M2	>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test					—
Test Date [YYYY-MM-DD].....:			2024-05-09		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:			2 minutes of 1500		—
Solution resistivity [Ω cm) .....:			2361		—
Solution temperature [℃] .....:			23.1		—
Sample #	Measured (MΩ)		Required (MΩ)		Result
21-M2	>1000		>15.5		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B1				
Sample #	21-M3			—
Table 19: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-01/2024-03-03		—
Temperature [℃] Duration [h] .....:		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-03		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-03		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

Table 20: MST 56 - Dry heat conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-06/2024-03-15		—
Temperature [℃] Duration [h] ..... :		105 ± 5 / 200		—
MST 01: Visual inspection after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-15		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-03-15		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table21: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-19/2024-03-29			—
Total cycles ..... :		10			—
Open circuits ..... :		☐ Yes	☒ No		P
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-03-29			—
Findings ..... :		☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-03-29			—
Cemented joints .....:		☐ Yes	☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: Size of module 2.58 [m²]					

Table 22: MST 55 - Cold conditioning					P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-01/2024-04-03			—
Temperature [℃] / Duration [h] ..... :		-40 / 48			—
MST 01: Visual inspection after Cold conditioning					—
Test Date [YYYY-MM-DD].....:		2024-04-03			—
Findings ..... :		☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Cold conditioning					—
Test Date [YYYY-MM-DD].....:		2024-04-03			—
Cemented joints .....:		☐ Yes	☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: Size of module 2.58 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 23: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-07/2024-04-17		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-17		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-17		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-17		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2369		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

SEQUENCE C					
Sample #	21-M4				—
Table 24: MST 54 - UV test					P
Front side					
Test Date [YYYY-MM-DD] start/end .....:		2024-03-06/2024-03-10			—
Module temperature [℃] .....:		61.2			—
Irradiation total [kWh/ m²] .....:		15.0			—
Open circuits .....:		☐ Yes	☒ No		P
Back side (only for bifacial modules)					
Test Date [YYYY-MM-DD] start/end .....:		2024-03-13/2024-03-17			—
Module temperature [℃] .....:		60.7			—
Irradiation total [kWh/ m²] .....:		15.0			—
Open circuits .....:		☐ Yes	☒ No		P
MST 01: Visual inspection after UV test					—
Test Date [YYYY-MM-DD].....:		2024-03-17			—
Findings ..... :		☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after UV test					—
Test Date [YYYY-MM-DD].....:		2024-03-17			—
Cemented joints.....:		☐ Yes	☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: Size of module 2.58 [m²]					

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

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-25/2024-04-03			—
Total cycles .....:		50			—
Applied current [A] .....:		15.76 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		60			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-04-03			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-04-03			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>15.5	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.58 [m²]					

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

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-08/2024-04-18		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-18		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-18		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-04-18		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2370		—
Solution temperature [℃] .....:		22.3		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD].....:		2024-04-19		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] .....:		40		—
Applied force perpendicular to the mounting surface [N] .....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-19		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-19		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-04-19		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V] .....:		2 minutes of 2025		—
Solution resistivity [Ω cm] .....:		2350		—
Solution temperature [℃] .....:		22.3		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: 1. Size of module 2.58 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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

SEQUENCE D				
Sample #	21-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-03-18/2024-04-30		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2381		—
Solution temperature [℃] .....:		22.9		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-07-07		—
Mounting method ....:	Clamps mounting (4 points on long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-07-07		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-07-07		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-07-07		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	2309		—
Solution temperature [℃] .... :	23.5		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

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

Supplementary information: Size of module 2.58 [m²]

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

SEQUENCE E				
Sample #	21-M8			—
Table 30: MST 51 - Thermal cycling test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-05-21/2024-06-26		—
Total cycles .....:		200		—
Applied current [A] .....:		15.81 during the heat up cycle from 40 ℃ to 80 ℃ 0.05 during other stages		—
Applied load [N] .....:		5		—
Limiting voltage [V] .....:		60		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-06-26		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-06-26		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after Thermal cycling test				—
Test Date [YYYY-MM-DD].....:		2024-06-26		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		2349		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE F		
Sample #	N/A	—
Table 31: MST 25 - Bypass diode thermal test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	21-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-03-06/2024-03-07	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle……......:	1232 W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	61.5/59.0	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	A13: 143.1; D01: 138.9; C12: 137.8; B09: 140.5	—
Shading rate [%] or number of cells shaded.....:	A13: 15; D01: 25; C12: 20; B09: 25	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•300W/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-07	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-07	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
13.45	51.68	12.77	43.94	561.1	80.72

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-07	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-03-07	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	2280	—
Solution temperature [℃] .....:	21.2	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>15.5	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	12		13	…	21	22	23	24
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 2.58 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	21-M13			—
Table 32: MST 21 - Temperature Test				P
Reference solar irradiance (W/m²) .....:	1000 W/m²			—
Reference ambient temperature (℃) .....:	40			—
Module at MPP				
Measuring location:	Component temperature T_{OBS} (℃)	Normalized temperature T_{CON} (℃)	Component temperature limit (℃)	—
PV module frontsheet above the centre cell	74.3	73.4	Glass	—
PV module backsheet below the centre cell	72.9	72.0	Glass	—
Terminal enclosure interior surface	70.1	69.2	110	P
Field wiring terminals	70.5	69.6	110	P
Insulation of the field wiring leads	68.4	67.5	110	P
External connector bodies	67.9	67.0	105	P
Bypass diode bodies	69.2	68.3	200	P
MST 01: Visual inspection after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-07-06			—
Findings ..... :	☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-07-06			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, DC) .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	×	P
MST 17: Wet leakage current test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-07-06			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied (V, dc) .....:	2 minutes of 1500			—
Solution resistivity (Ω cm) .....:	2357			—
Solution temperature (℃) .....:	23.0			—
Measured (MΩ)	Required (MΩ)			Result
>1000	>15.5			P
Supplementary information: Size of module 2.58 [m²]				

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

Sample #	21-M13			—
Table 34: MST 26 - Reverse current overload test				P
Test Date [YYYY-MM-DD] ..... :		2024-07-06		—
Module over-current protection rating [A]..... :		30		—
Test current [A]..... :		40.5		—
Range of applied voltage [V] ..... :		59.72/54.80		—
Test duration ..... :		2 hours		—
Observations				Result
Maximum external module surface temperature during the test [℃] ..... :		75.3		P
MST 01: Visual inspection after Reverse current overload test				—
Test Date [YYYY-MM-DD] ..... :		2024-07-06		—
Findings..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Reverse current overload test				—
Test Date [YYYY-MM-DD] ..... :		2024-07-06		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
MST 17: Wet leakage current test after Reverse current overload test				—
Test Date [YYYY-MM-DD] ..... :		2024-07-06		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc]..... :		2 minutes of 1500		—
Solution resistivity [Ω cm]..... :		2370		—
Solution temperature [℃] ..... :		23.2		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>15.5		P
Supplementary information: Size of module 2.58 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G				
Sample #:	21-M14			—
Table 35.2: MST 14 - Impulse voltage test				P
Test Date [YYYY-MM-DD] .....:		2024-03-04		—
Maximum system voltage [V] .....:		*1500*		—
Required Impulse voltage [V].....:		*18720*		—
Measured Impulse voltage [V] .....:		*18720*		P
T_1 [µs].....:		*1.2*		P
T_2 [µs].....:		*50*		P
Thickness of conductive foil [mm] .....:		0.05		—
Results				—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)				P
MST 01: Visual inspection after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-03-04		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Impulse voltage test				—
Test Date [YYYY-MM-DD].....:		2024-03-04		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>15.5	No breakdown	x	P
Supplementary information: Size of module 2.58 [m²]				

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

OTHER TESTS		
Sample #:	21-fire 1, 21-fire 2, 21-fire 3	—
Table 36: MST 23 - Fire test		P
Test Date [YYYY-MM-DD] .....:	2024-03-05	—
Module fire resistance class (A, B, C) .....:	C	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to Zhejiang Gather Uni. Please refer to annex 3 for detailed pictures after test.		

Sample #:	21-M16		—
Table 37: MST 24 - Ignitability test			P
Test Date [YYYY-MM-DD].....:	2024-03-22		—
Flame application point.....:	-		—
Surface exposure.....:	☒ Yes	☐ No	—
Backsheet foil exposure.....:	☐ Yes	☒ No	—
Frame adhesive exposure .....:	☒ Yes	☐ No	—
Edge exposure.....:	☒ Yes	☐ No	—
Junction box adhesive exposure.....:	☒ Yes	☐ No	—
Type label exposure .....:	☐ Yes	☒ No	—
Backrail adhesive exposure.....:	☐ Yes	☒ No	—
Ignition occurs .....:	☐ Yes	☒ No	—
Flame spread less as 150 mm	☒ Yes	☐ No	P
Length of destroyed area.....:	N/A		P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	21-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:		2024-03-01	—
Weight of impactor [kg] .....:		45.5	—
Thickness of sample [mm].....:		30	—
Mounting technique used.....:		Clamps mounting (4 points/long side with 2 beams across the module at the long sides)	—
Module breakage .....:		☒ No breakage	—
		☒ No separation from frame or mounting structure	—
		☐ Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
		☐ Breakage occurred, no particles larger than 65 cm ²ejected from sample	—
		☐ Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD]....::			2024-05-14 for 21-M2#; 2024-04-24 for 21-M3#; 2024-04-22 for 21-M4#; 2024-05-07 for 21-M6# 2024-06-27 for 21-M8#; 2024-03-12 for 21-M12# 2024-07-07 for 21-M13#			—
Module temperature [℃]....::			25			—
Irradiance [W/m²]....::			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A)	Vmp [V]	Pmp [W]	FF [%]
21-M2	13.20	51.32	12.45	43.57	542.4	80.07
21-M3	13.26	51.46	12.53	43.69	547.5	80.24
21-M4	13.28	51.29	12.60	43.41	547.0	80.31
21-M6	13.39	51.54	12.66	43.66	552.7	80.09
21-M8	13.45	51.66	12.75	43.88	559.5	80.52
21-M12	13.45	51.68	12.76	43.95	560.8	80.68
21-M13	13.48	51.75	12.77	44.00	561.8	80.54
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-05-14 for 21-M2#; 2024-04-24 for 21-M3# 2024-04-22 for 21-M4#; 2024-05-07 for 21-M6# 2024-06-27 for 21-M8#, 21-M10# 2024-03-12 for 21-M12#; 2024-07-07 for 21-M13#	—
Sample # 21-M2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M11	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 21-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings							P
Test Date [YYYY-MM-DD].....:		2024-05-14 for 21-M2#; 2024-04-24 for 21-M3# 2024-04-22 for 21-M4#; 2024-05-07 for 21-M6# 2024-06-27 for 21-M8#, 21-M10# 2024-03-12 for 21-M12#; 2024-07-07 for 21-M13#					—
Sample #	Markings legible		Not easily removable		No curling		Result
21-M2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD].....:		2024-05-14 for 21-M2#; 2024-04-24 for 21-M3# 2024-04-22 for 21-M4#; 2024-05-07 for 21-M6# 2024-06-27 for 21-M8#, 21-M10# 2024-03-12 for 21-M12#; 2024-07-07 for 21-M13#		—
Sample #	The black indicating tape is visible through the resulting cut.			Result
21-M2	☒ Yes	☐ No		P
21-M3	☒ Yes	☐ No		P
21-M4	☒ Yes	☐ No		P
21-M6	☒ Yes	☐ No		P
21-M8	☒ Yes	☐ No		P
21-M10	☒ Yes	☐ No		P
21-M12	☒ Yes	☐ No		P
21-M13	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:		2024-05-14 for 21-M2#; 2024-04-24 for 21-M3# 2024-04-22 for 21-M4#; 2024-05-07 for 21-M6# 2024-06-27 for 21-M8#, 21-M10# 2024-03-12 for 21-M12#; 2024-07-07 for 21-M13#		—
☐ **Method A**				—
Ambient temperature [℃].....:		N/A		—
Current flow applied [A].....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
21-M2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
21-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 47: MST 33a - Test for general screw connections			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Table 48: MST 33b - Test for locking screws			N/A
Test Date [YYYY-MM-DD]..... :		N/A	—
Sample #	Thread diameter [mm]	Torque [Nm]	Result
N/A	N/A	N/A	N/A
Supplementary information: N/A			

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Module type: TWMNH-66HD615 (BOM22)

Table 6: MST 01 - Initial Visual inspection			P
Test Date [YYYY-MM-DD] .....:		2024-04-07	—
Sample # 22-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M2-1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M2-2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M11	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—

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Clause	Requirement + Test	Result - Remark	Verdict
Sample # 22-M14	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M15	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M16	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-fire 1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-fire 2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-fire 3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: For creepage distances and clearances see Table 1 and Table 2.			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 7: MST 02 - Performance at STC and BNPI							—
Sample test .....:	22-M10						—
Test Date [YYYY-MM-DD] .....:	2024-04-16						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Rated I_{SC} including manufacturing tolerances ...:							—
Rated V_{OC} including manufacturing tolerances..:							—
	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
Front	15.483	48.680	14.874	41.446	616.49	81.79	—
Rear	12.314	48.311	11.665	41.914	488.92	82.18	—
BNPI	17.087	48.720	16.472	41.182	678.35	81.49	—
Supplementary information: N/A							

Table 8: MST 03 - Maximum power determination							—
Test Date [YYYY-MM-DD] .....:	2024-04-07 for 22-M1, 22-M2, 22-M3, 22-M13, 22-M14 2024-04-16 for 22-M4,22-M6, 22-M8, 22-M11, 22-M12						—
Irradiance [W/m²] .....:	1000						—
Module temperature [℃] .....:	25						—
Test method .....:	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
22-M1	15.409	48.643	14.836	41.537	616.24	82.21	—
22-M2	15.525	48.653	14.834	41.571	616.68	81.64	—
22-M3	15.472	48.685	14.850	41.573	617.37	81.96	—
22-M4	15.453	48.660	14.835	41.407	614.26	81.69	—
22-M6	15.475	48.562	14.858	41.333	614.14	81.72	—
22-M8	15.492	48.649	14.844	41.451	615.28	81.64	—
22-M11	15.582	48.646	14.882	41.414	616.32	81.31	—
22-M12	15.526	48.543	14.833	41.409	614.21	81.50	—
22-M13	15.592	48.672	14.877	41.531	617.84	81.42	—
22-M14	15.400	48.604	14.811	41.484	614.41	82.09	—
Supplementary information: N/A							

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Clause	Requirement + Test	Result - Remark	Verdict

Table 9: MST 16 - Initial Insulation test					P
Test Date [YYYY-MM-DD] .....:			2024-04-16		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
22-M1	>1000	>14.8	No breakdown	×	P
22-M2	>1000	>14.8	No breakdown	×	P
22-M3	>1000	>14.8	No breakdown	×	P
22-M4	>1000	>14.8	No breakdown	×	P
22-M6	>1000	>14.8	No breakdown	×	P
22-M8	>1000	>14.8	No breakdown	×	P
22-M10	>1000	>14.8	No breakdown	×	P
22-M11	>1000	>14.8	No breakdown	×	P
22-M12	>1000	>14.8	No breakdown	×	P
22-M13	>1000	>14.8	No breakdown	×	P
22-M14	>1000	>14.8	No breakdown	×	P
Supplementary information: Size of module 2.70 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 10: MST 17 - Initial Wet leakage current test			P
Test Date [YYYY-MM-DD] .....:		2024-04-16	—
Cemented joints.....:		☐ Yes ☒ No	—
Test Voltage applied [V, dc] .....:		2 minutes of 1500	—
Solution resistivity [Ω cm] .....:		1846	—
Solution temperature [℃] .....:		22.7	—
Sample #	Measured [MΩ]	Required [MΩ]	Result
22-M1	>1000	>14.8	P
22-M2	>1000	>14.8	P
22-M3	>1000	>14.8	P
22-M4	>1000	>14.8	P
22-M6	>1000	>14.8	P
22-M8	>1000	>14.8	P
22-M10	>1000	>14.8	P
22-M11	>1000	>14.8	P
22-M12	>1000	>14.8	P
22-M13	>1000	>14.8	P
Supplementary information: Size of module 2.70 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 11: MST 13 - Continuity test of equipotential bonding				P
Test Date **Initial** examination [YYYY-MM-DD] .. :		2024-04-16		—
Test Date **Final** examination [YYYY-MM-DD] ... :		2024-05-15 for 22-M1#, 22-M18#, 22-M19#, 22-M20#, 22-M21# 2024-06-05 for 22-M4#; 2024-06-10 for 22-M6# 2024-06-07 for 22-M8#, 22-M15# 2024-06-24 for 22-M2#, 22-M3#		—
Maximum over-current protection rating [A]..... :		35		—
Current applied [A] ..... :		87.5		—
Location of designated grounding point ..... :		The ground hole of one longer side		—
Location of second contacting point..... :		A: The center of another longer side B: Adjacent shorter side with greatest distance from the grounding point C: The center of the other shorter side		—
Sample #	Position in test sequence:	Voltage [V]	Resistance [Ω]	
22-M1	Initial examination	A:0.025 B:0.029 C:0.034	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MST 37			—
	Final examination	A:0.031 B:0.024 C:0.033	A:0.001 B:0.001 C:0.001	P
22-M2	Initial examination	A:0.031 B:0.041 C:0.033	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MST 53, MST 54, MST 52, MST 54, MST 52			—
	Final examination	A:0.026 B:0.022 C:0.029	A:0.001 B:0.001 C:0.001	P
22-M3	Initial examination	A:0.034 B:0.022 C:0.028	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52			—
	Final examination	A:0.026 B:0.031 C:0.034	A:0.001 B:0.001 C:0.001	P

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Clause	Requirement + Test	Result - Remark		Verdict
22-M4	Initial examination	A:0.035 B:0.033 C:0.031	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 12			—
	Final examination	A:0.033 B:0.034 C:0.041	A:0.001 B:0.001 C:0.001	P
22-M6	Initial examination	A:0.028 B:0.029 C:0.037	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MST 53, MST 34, MST 12			—
	Final examination	A:0.031 B:0.034 C:0.036	A:0.001 B:0.001 C:0.001	P
22-M8	Initial examination	A:0.034 B:0.031 C:0.029	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MST 51, MST 12			—
	Final examination	A:0.036 B:0.028 C:0.0278	A:0.001 B:0.001 C:0.001	P
22-M15	Initial examination	A:0.028 B:0.034 C:0.026	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MST 32			—
	Final examination	A:0.032 B:0.036 C:0.027	A:0.001 B:0.001 C:0.001	P
22-M18	Initial examination	A:0.035 B:0.033 C:0.026	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MQT 21			—
	Final examination	A:0.027 B:0.034 C:0.033	A:0.001 B:0.001 C:0.001	P

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Clause	Requirement + Test	Result - Remark		Verdict
22-M19	Initial examination	A:0.032 B:0.023 C:0.041	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MQT 21			—
	Final examination	A:0.031 B:0.027 C:0.034	A:0.001 B:0.001 C:0.001	P
22-M20	Initial examination	A:0.027 B:0.031 C:0.036	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MQT 21			—
	Final examination	A:0.031 B:0.035 C:0.033	A:0.001 B:0.001 C:0.001	P
22-M21	Initial examination	A:0.024 B:0.036 C:0.028	A:0.001 B:0.001 C:0.001	P
	Preconditioning: MQT 21			—
	Final examination	A:0.035 B:0.02 C:0.029	A:0.001 B:0.001 C:0.001	P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 12: MST 11 - Accessibility test			P
Test Date **Initial** examination [YYYY-MM-DD] ... :		2024-04-16	—
Test Date **Final** examination [YYYY-MM-DD] .... :		2024-05-15 for 22-M1# 2024-06-05 for 22-M4#; 2024-06-10 for 22-M6# 2024-06-07 for 22-M8# 2024-06-24 for 22-M2#, 22-M3#	—
Sample #	Position in test sequence:		
22-M1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 37, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
22-M2-1	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 54, MST 52, MST 12, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
22-M2-2	Initial examination, access?	☐ Yes ☒ No	N/A
	Preconditioning: MST 53, MST 54, MST 52, MST 12, MST 13		—
	Final examination, access?	☐ Yes ☒ No	N/A
22-M3	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 55, MST 56, MST 52, MST 55, MST 52, MST12		—
	Final examination, access?	☐ Yes ☒ No	P
22-M4	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 54, MST 51, MST 52, MST 42, MST 12, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
22-M6	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 53, MST 34, MST 12, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
22-M8	Initial examination, access?	☐ Yes ☒ No	P
	Preconditioning: MST 51, MST 12, MST 13		—
	Final examination, access?	☐ Yes ☒ No	P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE A				
Sample #	22-M1			—
Table 13: MST 37 - Materials creep test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-05-06/2024-05-15		—
Duration [h] .....:		200		—
Applied temperature [℃] .....:		105 ± 5		—
MST 01: Visual inspection after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-05-15		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
Supplementary information: For clearance and creepage distances see table 1.				
MST 16: Insulation test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-05-15		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	×	P
MST 17: Wet leakage current test after materials creep test				—
Test Date [YYYY-MM-DD].....:		2024-05-15		—
Cemented joint.....:		☐ Yes ☒ No		—
Test Voltage applied (V, dc) .....:		2 minutes of 1500		—
Solution resistivity (Ω cm) .....:		1956		—
Solution temperature (℃).....:		22.1		—
Measured(MΩ)		Required (MΩ)		Result
>1000		>14.8		P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.70 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B					
Table 14: MST 53 - Damp heat test					P
Test Date [YYYY-MM-DD] start/end .....:			2024-04-16/2024-04-25		—
Applied load [N] .....:			5		—
Duration [h] .....:			200		—
Sample #			—		—
22-M2			—		—
MST 01: Visual inspection after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-04-25		—
Sample # 22-M2	Findings .....:		☐ Yes ☒ No		P
	Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Damp heat test					—
Test Date [YYYY-MM-DD].....:			2024-04-25		—
Cemented joints .....:			☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
22-M2	>1000	>14.8	No breakdown	x	P
Supplementary information: Size of module 2.70 [m²]					

Table 15: MST 54 - UV test (front side)			P
Sample #	22-M2		—
Test Date [YYYY-MM-DD] start/end .....:		2024-04-25/2024-05-13	—
Module temperature [℃] .....:		62.2/58.7	—
Irradiation total [kWh/m²] .....:		60	—
Open circuits .....:		☐ Yes ☒ No	P
MST 01: Visual inspection after UV test			—
Test Date [YYYY-MM-DD].....:		2024-05-13	—
Findings ..... :		☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos		No visual defects	—
MST 16: Insulation test after UV test			—
Test Date [YYYY-MM-DD].....:		2024-05-13	—

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Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P
Supplementary information: Size of module 2.70 [m²]				

Table16: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end ..... :		2024-05-13/2024-05-24		—
Total cycles ..... :		10		—
Open circuits ..... :		☐ Yes ☒ No		P
Sample #	—			—
22-M2	—			—
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD]..... :		2024-05-24		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD]..... :		2024-05-24		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown	Result
	MΩ	MΩ	Yes (description)	No
22-M2	>1000	>14.8	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test				—
Test Date [YYYY-MM-DD]..... :		2024-05-24		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc]..... :		2 minutes of 1500		—
Solution resistivity [Ω cm) ..... :		1974		—
Solution temperature [℃] ..... :		22.4		—
Sample #	Measured (MΩ)	Required (MΩ)		Result
22-M2	>1000	>14.8		P
Supplementary information: Size of module 2.70 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 17: MST 54 - UV test (back side)					P
Sample #	22-M2				—
Test Date [YYYY-MM-DD] start/end .....:		2024-05-24/2024-06-11			—
Module temperature [℃] .....:		62.1/57.4			—
Irradiation total [kWh/m²] .....:		60			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after UV test					—
Test Date [YYYY-MM-DD].....:		2024-06-11			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after UV test					—
Test Date [YYYY-MM-DD].....:		2024-06-11			—
Cemented joints .....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>14.8	No breakdown		x	P
Supplementary information: Size of module 2.70 [m²]					

Table18: MST 52 - Humidity freeze test			P
Test Date [YYYY-MM-DD] start/end .....:		2024-06-12/2024-06-23	—
Total cycles .....:		10	—
Open circuits .....:		☐ Yes ☒ No	P
Sample #	—		—
22-M2	—		—
MST 01: Visual inspection after Humidity freeze test			—
Test Date [YYYY-MM-DD].....:		2024-06-23	—
Findings ..... :		☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos		No visual defects	—
MST 16: Insulation test after Humidity freeze test			—
Test Date [YYYY-MM-DD].....:		2024-06-23	—
Cemented joints .....:		☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V, DC] .....:			2 minutes of 1500 and 1 minute of 8000		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
22-M2	>1000	>14.8	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze 10 test					—
Test Date [YYYY-MM-DD].....:			2024-06-23		—
Cemented joints.....:			☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:			2 minutes of 1500		—
Solution resistivity [Ω cm) .....:			1875		—
Solution temperature [℃] .....:			22.1		—
Sample #	Measured (MΩ)		Required (MΩ)		Result
22-M2	>1000		>14.8		P
Supplementary information: Size of module 2.70 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE B1				
Sample #	22-M3			—
Table 19: MST 55 - Cold conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-28/2024-04-30		—
Temperature [℃] Duration [h] .....:		-40 / 48		—
MST 01: Visual inspection after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Cold conditioning				—
Test Date [YYYY-MM-DD].....:		2024-04-30		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.82.9	No breakdown	x	P
Supplementary information: Size of module 2.70 [m²]				

Table 20: MST 56 - Dry heat conditioning				P
Test Date [YYYY-MM-DD] start/end .....:		2024-05-06/2024-05-15		—
Temperature [℃] Duration [h] ..... :		105 ± 5 / 200		—
MST 01: Visual inspection after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-05-15		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Dry heat conditioning				—
Test Date [YYYY-MM-DD].....:		2024-05-15		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P
Supplementary information: This test is conducted based on IEC 61730-2:2016. (105 ± 5) ℃ is applied, higher than the required (90 ± 3) ℃. Size of module 2.70 [m²]				

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

Table21: MST 52 - Humidity freeze test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-05-24/2024-06-05			—
Total cycles ..... :		10			—
Open circuits ..... :		☐ Yes ☒ No			P
MST 01: Visual inspection after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-06-05			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Humidity freeze test					—
Test Date [YYYY-MM-DD].....:		2024-06-05			—
Cemented joints .....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>14.8	No breakdown		x	P
Supplementary information: Size of module 2.70 [m²]					

Table 22: MST 55 - Cold conditioning					P
Test Date [YYYY-MM-DD] start/end .....:		2024-06-06/2024-06-08			—
Temperature [℃] / Duration [h] ..... :		-40 / 48			—
MST 01: Visual inspection after Cold conditioning					—
Test Date [YYYY-MM-DD].....:		2024-06-08			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Cold conditioning					—
Test Date [YYYY-MM-DD].....:		2024-06-08			—
Cemented joints .....:		☐ Yes ☒ No			—
Test Voltage applied (V, DC) .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>14.8	No breakdown		x	P
Supplementary information: Size of module 2.70 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 23: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-06-12/2024-06-23		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-06-23		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-06-23		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-06-23		—
Cemented joints .....:		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		1875		—
Solution temperature [℃] .....:		22.1		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>14.8		P
Supplementary information: Size of module 2.70 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE C				
Sample #	22-M4			—
Table 24: MST 54 - UV test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-23/2024-05-06		—
Module temperature [℃] .....:		60.7		—
Irradiation total [kWh/ m²] .....:		15 Front/15 Rear		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after UV test				—
Test Date [YYYY-MM-DD].....:		2024-05-06		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after UV test				—
Test Date [YYYY-MM-DD].....:		2024-05-10		—
Cemented joints.....:		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P
Supplementary information: Size of module 2.70 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 25: MST 51 - Thermal cycling test					P
Test Date [YYYY-MM-DD] start/end .....:		2024-05-15/2024-05-23			—
Total cycles .....:		50			—
Applied current [A] .....:		18.55 during the heat up cycle from 40 ℃ to 80 ℃ 0.10 during other stages			—
Applied load [N] .....:		5			—
Limiting voltage [V].....:		80			—
Open circuits .....:		☐ Yes ☒ No			P
MST 01: Visual inspection after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-05-23			—
Findings ..... :		☐ Yes ☒ No			P
Nature and position of findings – comments or attach photos		No visual defects			—
MST 16: Insulation test after Thermal cycling test					—
Test Date [YYYY-MM-DD].....:		2024-05-23			—
Cemented joints.....:		☐ Yes ☒ No			—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown			Result
MΩ	MΩ	Yes (description)		No	
>1000	>14.8	No breakdown		x	P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.70 [m²]					

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Clause	Requirement + Test	Result - Remark	Verdict

Table 26: MST 52 - Humidity freeze test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-05-24/2024-06-05		—
Total cycles .....:		10		—
Open circuits .....:		☐ Yes ☒ No		P
MST 01: Visual inspection after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-06-05		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-06-05		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P
MST 17: Wet leakage current test after humidity freeze test				—
Test Date [YYYY-MM-DD].....:		2024-06-05		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		1845		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>14.8		P
Supplementary information: Size of module 2.70 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 27: MST 42 - Robustness of terminations test				P
Test Date [YYYY-MM-DD].....:		2024-06-05		—
MQT 14.1: Retention of junction box on mounting surface				
Applied force in all directions parallel to the mounting surface and parallel to the module edges [N] .....:		40		—
Applied force perpendicular to the mounting surface [N] .....:		40		—
Supplementary information: N/A				
MST 01: Visual inspection after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-06-05		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-06-05		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 2025 and 1 minute of 10800		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P
MST 17: Wet leakage current test after retention of junction box on mounting surface				—
Test Date [YYYY-MM-DD].....:		2024-06-05		—
Cemented joints.....:		☒ Yes ☐ No		—
Test Voltage applied [V] .....:		2 minutes of 2025		—
Solution resistivity [Ω cm] .....:		1876		—
Solution temperature [℃] .....:		21.4		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>14.8		P
Supplementary information: 1. Size of module 3.11 [m²] 2. 1.35*Utest is performed for Insulation test MST16 and Wet leakage current test MST17 after retention of junction box.				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE D				
Sample #	22-M6			—
Table 28: MST 53 - Damp heat test				P
Test Date [YYYY-MM-DD] start/end .....:		2024-04-23 / 2024-06-06		—
Applied load [N] .....:		5		—
Total hours .....:		1000		—
MST 01: Visual inspection after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-06-06		—
Findings ..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-06-06		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P
MST 17: Wet leakage current test after damp heat test				—
Test Date [YYYY-MM-DD].....:		2024-06-06		—
Cemented joints..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:		2 minutes of 1500		—
Solution resistivity [Ω cm] .....:		1934		—
Solution temperature [℃] .....:		22.8		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>14.8		P
Supplementary information: Size of module 2.70 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 29: MST 34 - Static mechanical load test			P
Test Date [YYYY-MM-DD]....:	2024-06-10		—
Mounting method ....:	Clamps mounting (8 points/long side with two beams across the module at the long side)		—
Design Load [Pa] / Safety factor ɣm....:	front side 3600/1.5 back side 1600/1.5		—
Load applied to....:	front side	back side	—
Mechanical load [Pa] ....:	5400	2400	—
First cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Second cycle time (start/end)....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Third cycle time (start/end) ....:	1h	1h	—
Intermittent open circuit (yes/no) ....:	No	No	P
Supplementary information: N/A			
MST 01: Visual inspection after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-06-10		—
Findings .... :	☐ Yes	☒ No	P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-06-10		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, DC] ....:	2 minutes of 1500 and 1 minute of 8000		—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P

MST 17: Wet leakage current test after Static mechanical load test			—
Test Date [YYYY-MM-DD]....:	2024-06-10		—
Cemented joints....:	☐ Yes	☒ No	—
Test Voltage applied [V, dc].... :	2 minutes of 1500		—
Solution resistivity [Ω cm) ....:	1965		—
Solution temperature [℃] .... :	21.9		—

Measured [MΩ]	Required [MΩ]	Result
>1000	>14.8	P

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information: Size of module 2.70 [m²]			
SEQUENCE E			
Sample #	22-M8		—
Table 30: MST 51 - Thermal cycling test			P
Test Date [YYYY-MM-DD] start/end .....:	2024-04-30/2024-06-06		—
Total cycles .....:	200		—
Applied current [A] .....:	18.35 during the heat up cycle from 40 ℃ to 80 ℃ 0.10 during other stages		—
Applied load [N] .....:	5		—
Limiting voltage [V] .....:	80		—
Open circuits .....:	☐ Yes ☒ No		P
MST 01: Visual inspection after Thermal cycling test			—
Test Date [YYYY-MM-DD].....:	2024-06-06		—
Findings ..... :	☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos	No visual defects		—
MST 16: Insulation test after Thermal cycling test			—
Test Date [YYYY-MM-DD].....:	2024-06-06		—
Cemented joints.....:	☐ Yes ☒ No		—
Test Voltage applied [V, DC] .....:	2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown	Result
MΩ	MΩ	Yes (description) / No	
>1000	>14.8	No breakdown / x	P
MST 17: Wet leakage current test after Thermal cycling test			—
Test Date [YYYY-MM-DD].....:	2024-06-06		—
Cemented joints.....:	☐ Yes ☒ No		—
Test Voltage applied [V, dc].....:	2 minutes of 1500		—
Solution resistivity [Ω cm] .....:	1931		—
Solution temperature [℃] .....:	22.8		—
Measured [MΩ]	Required [MΩ]		Result
>1000	>14.8		P
Supplementary information: For bifacial modules, the current applied during heat up cycle shall be equal to the peak power current at elevated irradiance aBSI. Size of module 2.70 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE F					
Sample #	22-M11				—
Table 31: MST 25 - Bypass diode thermal test					P
Test Date [YYYY-MM-DD] start/end .....:	2024-06-04				—
Module temperature [℃] .....:	75				—
Number of diodes in junction box.....:	3				—
Diode manufacturer .....:	Tongwei Solar (Hefei) Co., Ltd.				—
Diode type designation .....:	40SQ045				—
Max. permissible junction temperature T_{Jmax} [℃] (according to diode datasheet).....:	200				—
Step 1, Determination of V_D versus T_J characteristic					—
Diode	**1**				
Ambient temperature of the junction box [℃]....:	30 ± 2	50 ± 2	70 ± 2	90 ± 2	—
Pulsed current.....:	19.44	19.44	19.44	19.44	—
Voltage drop [V] .....:	0.3421	0.3218	0.2984	0.2765	—
V_D versus T_J characteristic .....:	V_D=0.3758 - 1.1 x 10^{-3} T_J				
Max. permissible junction temperature T_{Jmax} [℃] (according to diode datasheet)..... :	200				—
Diode	**2**				
Ambient temperature of the junction box [℃]....:	30 ± 2	50 ± 2	70 ± 2	90 ± 2	—
Pulsed current.....:	19.44	19.44	19.44	19.44	—
Voltage drop [V] .....:	0.3532	0.3344	0.3126	0.2887	—
V_D versus T_J characteristic .....:	V_D=0.3868 - 1.1 x 10^{-3} T_J				
Max. permissible junction temperature T_{Jmax} [℃] (according to diode datasheet)..... :	200				—
Diode	**3**				
Ambient temperature of the junction box [℃]....:	30 ± 2	50 ± 2	70 ± 2	90 ± 2	—
Pulsed current.....:	19.44	19.44	19.44	19.44	—
Voltage drop [V] .....:	0.3476	0.3265	0.3014	0.2843	—
V_D versus T_J characteristic .....:	V_D=0.3795 - 1.1 x 10^{-3} T_J				
Max. permissible junction temperature T_{Jmax} [℃] (according to diode datasheet)..... :	200				—
Step 2, Bypass diode thermal test					—
	Diode 1	Diode 2	Diode 3		Result
Current flow applied* [A].....:	19.44	19.44	19.44		—
Max. diode surface temperature allowed T_{Jmax} [℃],.....:	200	200	200		—

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Clause	Requirement + Test	Result - Remark	Verdict

Voltage drop [V] after 1h.....:	0.2123	0.2334	0.2123	—
Calculated max. junction temperature T_{Jcalc} [℃]:	148.6	139.5	156.5	—
$T_{Jcalc} < T_{Jmax}$ (test passed)? yes/no.....:	Yes	Yes	Yes	P
Current flow** (1.25 x Isc) [A] .....:	24.30	24.30	24.30	—
Bypass diode remain(s) functional (yes/no).....:	Yes	Yes	Yes	P
Supplementary information: See Table 43 for the test details of bypass diode functionality test. For bifacial modules, * current for the 1st hour shall be $I_{SC\text{-}aBSI}$, ** current for the 2nd hour shall be 1.25 x $I_{SC\text{-}aBSI}$.				
MST 01: Visual inspection after Bypass diode thermal test				—
Test Date [YYYY-MM-DD].....:	2024-06-04			—
Findings ..... :	☐ Yes	☒ No		P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Bypass diode thermal test				—
Test Date [YYYY-MM-DD].....:	2024-06-04			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied [V, DC] .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P
MST 17: Wet leakage current test after Bypass diode thermal test				—
Test Date [YYYY-MM-DD]:.....	2024-06-04			—
Cemented joints.....:	☐ Yes	☒ No		—
Test Voltage applied [V]:.....	2 minutes of 1500			—
Solution resistivity [Ω cm] .....:	1865			—
Solution temperature [℃] .....:	22.6			—
Measured [MΩ]	Required [MΩ]			Result
>1000	>14.8			P
Supplementary information: Size of module 2.70 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	22-M12	—
Table 33: MST 22 - Hot-spot endurance test		P
Test Date [YYYY-MM-DD] start/end .....:	2024-06-10	—
Cell interconnection circuit.....:	☐ S ☒ SPS ☐ PS	—
Irradiance during each cycle…….....:	1236W/m²	—
Module temperature at thermal equilibrium in each cycle [℃] .....:	52.4/51.6	—
Determination of worst case cell		—
Maximum measured cell temperature in each cycle [℃] .....:	A7: 134.7; F10: 146.4; B21: 152.3; C5: 126.8; A11: 142.5	—
Shading rate [%] or number of cells shaded.....:	A7: 20; F10: 20; B21: 20; C5: 15; A11: 20	—
Test hours for each cycle.....:	1	—
Supplementary information: For bifacial PV modules, the exposure was performed under aBSI which is equal to 1000W/m² + φ•xxxW/m².		
MST 01: Visual inspection after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-06-11	—
Findings ..... :	☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos	No visual defects	—
MST 02: Maximum power determination after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-06-11	—
Module temperature [℃] .....:	Corrected to 25.0	—
Irradiance [W/m²] .....:	Corrected to 1000	—

Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]
15.516	48.501	14.873	41.341	614.32	81.63

MST 16: Insulation test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-06-11	—
Cemented joints.....:	☐ Yes ☒ No	—
Test Voltage applied [V] .....:	2 minutes of 1500 and 1 minute of 8000	—

Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P

MST 17: Wet leakage current test after hot-spot endurance test		—
Test Date [YYYY-MM-DD].....:	2024-06-11	—
Cemented joints.....:	☐ Yes ☒ No	—

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Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] .....:	2 minutes of 1500	—
Solution resistivity [Ω cm] .....:	1923	—
Solution temperature [℃] .....:	22.7	—
Measured [MΩ]	Required [MΩ]	Result
>1000	>14.8	P

Supplementary information:

(1) Position of solar cells (front side view):

	1	2	3	4	…	11		12	…	19	20	21	22
A							Junction box						
B													
C													
D													
E													
F													

(2) Size of module 2.70 [m²]

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	22-M13			—
Table 32: MST 21 - Temperature Test				P
Reference solar irradiance (W/m²) .....:	1000 W/m²			—
Reference ambient temperature (℃) .....:	41.4			—
Module at MPP				
Measuring location:	Component temperature T_{OBS} (℃)	Normalized temperature T_{CON} (℃)	Component temperature limit (℃)	—
PV module frontsheet above the centre cell	74.3	72.9	Glass	—
PV module backsheet below the centre cell	76.8	75.4	Glass	—
Terminal enclosure interior surface	62.4	61.0	90	P
Field wiring terminals	53.2	51.8	90	P
Insulation of the field wiring leads	57.8	56.4	90	P
External connector bodies	55.6	54.2	90	P
Bypass diode bodies	63.2	61.8	200	P
MST 01: Visual inspection after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-05-08			—
Findings ..... :	☐ Yes ..... ☒ No			P
Nature and position of findings – comments or attach photos	No visual defects			—
MST 16: Insulation test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-05-08			—
Test Voltage applied (V, DC) .....:	2 minutes of 1500 and 1 minute of 8000			—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	×	P
MST 17: Wet leakage current test after Temperature Test				—
Test Date (YYYY-MM-DD) .....:	2024-05-08			—
Test Voltage applied (V, dc) .....:	2 minutes of 1500			—
Solution resistivity (Ω cm) .....:	1876			—
Solution temperature (℃) .....:	22.1			—
Measured (MΩ)	Required (MΩ)			Result
>1000	>14.8			P
Supplementary information: Size of module 2.70 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #	22-M13			—
Table 34: MST 26 - Reverse current overload test				P
Test Date [YYYY-MM-DD] ..... :		2024-05-09		—
Module over-current protection rating [A]..... :		35		—
Test current [A]..... :		47.25		—
Range of applied voltage [V] ..... :		52.25/47.34		—
Test duration ..... :		2 hours		—
Observations				Result
Maximum external module surface temperature during the test [℃] ..... :		80.9		P
MST 01: Visual inspection after Reverse current overload test				—
Test Date [YYYY-MM-DD]..... :		2024-05-09		—
Findings..... :		☐ Yes ☒ No		P
Nature and position of findings – comments or attach photos		No visual defects		—
MST 16: Insulation test after Reverse current overload test				—
Test Date [YYYY-MM-DD]..... :		2024-05-09		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, DC] ..... :		2 minutes of 1500 and 1 minute of 8000		—
Measured	Required	Dielectric breakdown		Result
MΩ	MΩ	Yes (description)	No	
>1000	>14.8	No breakdown	x	P
MST 17: Wet leakage current test after Reverse current overload test				—
Test Date [YYYY-MM-DD]..... :		2024-05-09		—
Cemented joints ..... :		☐ Yes ☒ No		—
Test Voltage applied [V, dc]..... :		2 minutes of 1500		—
Solution resistivity [Ω cm]..... :		1965		—
Solution temperature [℃] ..... :		22.5		—
Measured [MΩ]		Required [MΩ]		Result
>1000		>14.8		P
Supplementary information: Size of module 2.70 [m²]				

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Clause	Requirement + Test	Result - Remark	Verdict

SEQUENCE G			
Sample #:	22-M14		—
Table 35.2: MST 14 - Impulse voltage test			P
Test Date [YYYY-MM-DD] .....:		2024-06-20	—
Maximum system voltage [V] .....:		*1500*	—
Required Impulse voltage [V].....:		*19680*	—
Measured Impulse voltage [V] .....:		*19680*	P
T_1 [µs].....:		*1.2*	P
T_2 [µs].....:		*50*	P
Thickness of conductive foil [mm] .....:		0.05	—
Results			—
☒ No evidence of dielectric breakdown or surface tracking observed ☒ No evidence of major visual defects (see table MST 01 below)			P
MST 01: Visual inspection after Impulse voltage test			—
Test Date [YYYY-MM-DD].....:		2024-06-20	—
Findings ..... :		☐ Yes ☒ No	P
Nature and position of findings – comments or attach photos		No visual defects	—
MST 16: Insulation test after Impulse voltage test			—
Test Date [YYYY-MM-DD].....:		2024-06-20	—
Cemented joints..... :		☐ Yes ☒ No	—
Test Voltage applied [V, DC] .....:		2 minutes of 1500 and 1 minute of 8000	—
Measured	Required	Dielectric breakdown	Result
MΩ	MΩ	Yes (description) / No	
>1000	>14.8	No breakdown / x	P
Supplementary information: This test is performed on a framed module and subcontracted to CPVT. Size of module 2.70 [m²]			

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Clause	Requirement + Test	Result - Remark	Verdict

OTHER TESTS		
Sample #:	22-fire 1, 22-fire 2, 22-fire 3	—
Table 36: MST 23 - Fire test		P
Test Date [YYYY-MM-DD] .....:	2024-06-24	—
Module fire resistance class (A, B, C) .....:	C	—
No. of modules provided to create the test assembly .....:	2 for spread of flame test 1 for burning brand test	—
☒ The module complies with the requirements for the fire resistance class		P
Supplementary information: This test is subcontracted to CPVT.		

Sample #:	22-M16		—
Table 37: MST 24 - Ignitability test			P
Test Date [YYYY-MM-DD].....:	2024-06-23		—
Flame application point.....:	N/A		—
Surface exposure.....:	☒ Yes	☐ No	—
Backsheet foil exposure.....:	☐ Yes	☒ No	—
Frame adhesive exposure .....:	☒ Yes	☐ No	—
Edge exposure.....:	☒ Yes	☐ No	—
Junction box adhesive exposure.....:	☒ Yes	☐ No	—
Type label exposure .....:	☐ Yes	☒ No	—
Backrail adhesive exposure.....:	☐ Yes	☒ No	—
Ignition occurs .....:	☐ Yes	☒ No	—
Flame spread less as 150 mm	☒ Yes	☐ No	P
Length of destroyed area.....:	N/A		P
Supplementary information: This test is subcontracted to CPVT.			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	22-M15		—
Table 38: MST 32 - Module breakage test			P
Test Date [YYYY-MM-DD] .....:		2024-05-12	—
Weight of impactor [kg] .....:		45.5	—
Thickness of sample [mm].....:		30	—
Mounting technique used.....:		Clamps mounting (8 points/long side with 2 beams across the module at the long sides)	—
Module breakage .....:		☒ No breakage	—
		☒ No separation from frame or mounting structure	—
		☐ Breakage occurred, no shear or opening large enough for a 76 mm diameter sphere to pass freely developed	—
		☐ Breakage occurred, no particles larger than 65 cm ²ejected from sample	—
		☐ Continuity of equipotential bonding provided, see table 10.11	—
Nature and position of findings – comments or attach photos			Result
No visual defects			P
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Sample #:	N/A	—
Table 39: MST 35 - Peel test (only for cemented joints)		N/A

Sample #:	N/A	—
Table 40: MST 36 - Lap shear strength test (only for cemented joints)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Table 41: MST 12 - Cut susceptibility test	N/A

Table 42: MST 03 - Maximum power determination final						—
Test Date [YYYY-MM-DD] .....:			2024-05-15 for 22-M1# 2024-06-05 for 22-M4#; 2024-06-10 for 22-M6# 2024-06-07 for 22-M8# 2024-06-24 for 22-M2#, 22-M3#, 22-M11#, 22-M12#, 22-M13#			—
Module temperature [℃].....:			25			—
Irradiance [W/m²].....:			1000			—
Sample #	Isc [A]	Voc [V]	Imp [A)	Vmp [V]	Pmp [W]	FF [%]
22-M1	15.559	48.600	14.883	41.095	611.62	80.88
22-M2	15.325	48.353	14.249	41.371	589.50	79.56
22-M3	15.258	48.474	14.430	41.387	597.22	80.75
22-M4	15.642	47.805	14.806	40.260	596.09	79.72
22-M6	15.386	48.458	14.456	41.321	597.34	80.12
22-M8	15.617	48.715	14.918	40.922	610.49	80.25
22-M11	15.853	48.265	14.868	41.243	613.21	80.14
22-M12	15.516	48.501	14.873	41.341	614.32	81.63
22-M13	15.576	48.720	14.891	41.405	616.56	81.25
Supplementary information: N/A						

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Clause	Requirement + Test	Result - Remark	Verdict

Table 43: MST 01 - Final Visual inspection			P
Test Date [YYYY-MM-DD].....:		2024-05-15 for 22-M1# 2024-06-05 for 22-M4#; 2024-06-10 for 22-M6# 2024-06-07 for 22-M8# 2024-06-24 for 22-M2#, 22-M3#, 22-M10#, 22-M11#, 22-M12#, 22-M13#	—
Sample # 22-M1	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M2	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M3	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M4	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M6	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M8	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M10	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M11	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M12	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Sample # 22-M13	Findings .....:	☐ Yes ☒ No	P
	Nature and position of findings – comments or attach photos	No visual defects	—
Supplementary information: N/A			

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Clause	Requirement + Test	Result - Remark	Verdict

Table 44: MST 05 - Durability of markings								P
Test Date [YYYY-MM-DD].....:			2024-06-05 for 22-M4#; 2024-06-10 for 22-M6# 2024-06-07 for 22-M8# 2024-06-24 for 22-M2#, 22-M3#, 22-M10#, 22-M11#, 22-M12#, 22-M13#					—
Sample #	Markings legible		Not easily removable		No curling			Result
22-M2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		N/A
22-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
22-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
22-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
22-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
22-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
22-M11	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
22-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
22-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No		P
Supplementary information: N/A								

Table 45: MST 06 - Sharp edge test				P
Test Date [YYYY-MM-DD].....:		2024-06-05 for 22-M4#; 2024-06-10 for 22-M6# 2024-06-07 for 22-M8# 2024-06-24 for 22-M2#, 22-M3#, 22-M10#, 22-M11#, 22-M12#, 22-M13#		—
Sample #	The black indicating tape is visible through the resulting cut.			Result
22-M2	☒ Yes	☐ No		P
22-M3	☒ Yes	☐ No		P
22-M4	☒ Yes	☐ No		P
22-M6	☒ Yes	☐ No		P
22-M8	☒ Yes	☐ No		P
22-M10	☒ Yes	☐ No		P
22-M11	☒ Yes	☐ No		P
22-M12	☒ Yes	☐ No		P
22-M13	☒ Yes	☐ No		P
Supplementary information: N/A				

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Clause	Requirement + Test	Result - Remark	Verdict

Table 46: MST 07 - Bypass diode functionality test				P
Test Date [YYYY-MM-DD].....:		2024-06-05 for 22-M4#; 2024-06-10 for 22-M6# 2024-06-07 for 22-M8# 2024-06-24 for 22-M2#, 22-M3#, 22-M10#, 22-M11#, 22-M12#, 22-M13#		—
☐ **Method A**				—
Ambient temperature [℃].....:		N/A		—
Current flow applied [A].....:		N/A		—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %	Result
N/A	N/A	N/A	☐ Yes ☐ No	N/A
☒ **Method B**				—

Sample #	IV curve after shading						Result
	Diode 1 working properly		Diode 2 working properly		Diode 3 working properly		
22-M2	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
22-M3	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
22-M4	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
22-M6	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
22-M8	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
22-M10	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
22-M11	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
22-M12	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
22-M13	☒ Yes	☐ No	☒ Yes	☐ No	☒ Yes	☐ No	P
Supplementary information: N/A							

Table 47: MST 33a - Test for general screw connections	N/A

Table 48: MST 33b - Test for locking screws	N/A

Sample #	N/A	—
Table 49: MST 04 - Insulation thickness test		N/A

Annex 1: Constructional Details

Circuit diagram

N/A

Layout drawing

N/A

Assembly drawing

N/A

Frame cross section and key corner

N/A

Annex 2: List of Test Equipment Used

TÜV NORD Testing (Suzhou) Co., Ltd.

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
10.2	Visual inspection	Luminometer (TNRDTO002)	0 - 1500 Lux	2024-03-26	2025-03-25
10.3	Performance at STC	Pulsed Solar Simulator (TNRDEQ043)	100 - 1200 W/m^2	2023-12-01	2024-11-30
10.4	Maximum power determination	Pulsed Solar Simulator (TNRDEQ043)	100 - 1200 W/m^2	2023-12-01	2024-11-30
10.5	Insulation thickness test	Metallurgical microscope (TNRDTI023)	N/A	2023-03-15	2024-03-14
10.6	Durability of markings	Clock (TNRDTO010)	0 - 3600 s	2023-10-10	2024-10-09
10.7	Sharp edge test	Sharp edge tester (TNRDTO053)	23 mm/s	2023-10-09	2024-10-08
10.8	Bypass diode functionality test	Pulsed Solar Simulator (TNRDEQ043)	100 - 1200 W/m^2	2023-12-01	2024-11-30
10.9	Accessibility test	Test finger (TNRDTI010)	0 - 75V	2023-10-23	2024-10-22
10.10	Cut susceptibility test	Cut susceptibility tester (TNRDTO015)	0 - 180 ° 8.9N	2023-10-23	2024-10-22
10.11	Continuity test of equipotential bonding	Safety tester (TNRDTI020)	0 - 12 kV 0 - 62.5 A	2023-10-09	2024-10-08
10.12	Impulse voltage test	Pulse Voltage Generator (ES21-77)	N/A	2023-08-30	2024-08-29
10.13	Insulation test	Withstanding voltage / Insulation resistance tester (TNRDTI020)	0 - 12 kV 0 - 999 MΩ	2023-10-09	2024-10-08
		Thermometer (TNRDTO003)	0 - 50 ℃ 20 - 90%RH	2024-03-13	2025-03-12
10.14	Wet leakage current test	Withstanding voltage / Insulation resistance tester (TNRDTI020)	0 - 12 kV 0 - 999 MΩ	2023-10-09	2024-10-08
		Conductive meter (TNRDTI004)	0 - 10000 µS/cm	2024-03-13	2025-03-12
10.15	Temperature test	Steady-state solar simulator (TNRDEQ011)	600 - 1200 W/m^2	2024-03-25	2025-03-24

10.16	Hot-spot endurance test	Steady-state solar simulator (TNRDEQ011)	600 - 1400 W/m^2	2024-03-25	2025-03-24
		Pulsed Solar Simulator (TNRDEQ043)	100 - 1200 W/m^2	2023-12-01	2024-11-30
		IR Camera (TNRDTI014)	25 - 200 ℃	2023-10-13	2024-10-12
10.17	Fire test	Air Velocity Transmitter (ES21-44-02, ES21-44-03, ES21-44-04)	N/A	2023-10-27	2024-10-26
		Thermcouple (ES21-44-01)	N/A	2023-07-28	2024-07-27
		High-temp. Chamber (TT21-20-01)	N/A	2023-07-28	2024-07-27
10.18	Ignitability test	PV module ignitability tester (ES21-385)	N/A	2023-08-30	2024-08-29
		High temperature chamber (TT20-48)	N/A	2023-09-29	2024-09-28
10.20	Reverse current overload test	DC Power Supply (TNRDTI007)	0~100 V 0~50 A	2024-03-10	2025-03-09
		IR Camera (TNRDTI014)	25~200 ℃	2023-10-13	2024-10-12
10.21	Module breakage test	Impact tester (TNRDEQ002)	45.5 kg	2023-10-09	2024-10-08
10.23	Static mechanical load test	Mechanical load tester (TNRDSM001)	100 - 500 kgf	2023-10-09	2024-10-08
10.26	Materials creep test	High and low temperature chamber (TNRDEQ012)	0~105 ℃	2024-03-12	2025-03-11
10.27	Robustness of terminations test	Digital display push pull meter (TNRDTI003)	0 - 100 N	2024-03-10	2025-03-09
		Weight (TNRDTO054)	40 N	2023-10-19	2024-10-18
10.28	Thermal cycling test	High and low temperature chamber (TNRDEQ005)	-40 - 85 ℃ 85%RH	2024-03-13	2025-03-12
		DC Power Supply (TNRDTI011)	0 - 80V 0 - 50A	2024-03-10	2025-03-09
		Weights (TNRDTO061)	5N	2023-06-17	2024-06-16

10.29	Humidity freeze test	Temperature/humidity cycling environment chamber (TNRDEQ008)	-40 - 85 ℃ 85%RH	2024-03-13	2025-03-12
		DC Power Supply (TNRDTI025)	0 - 100V 0 - 100mA	2023-10-09	2024-10-08
10.30	Damp heat test	High and low temperature chamber (TNRDEQ006)	60 - 85 ℃ 85%RH	2024-03-12	2025-03-11
		Weights (TNRDTO061)	5N	2023-06-17	2024-06-16
10.31	UV test	High and low temperature chamber (TNRDEQ012)	25~105 ℃	2024-03-12	2025-03-11
10.32	Cold conditioning	Humidity cycling environment chamber (TNRDEQ008)	-40 - 85 ℃ 85%RH	2024-03-13	2025-03-12
10.33	Dry heat conditioning	High and low temperature chamber (TNRDEQ012)	25 - 105 ℃	2024-03-12	2025-03-11
10.34	Evaluation of insulation coordination	Steel tape (TNRDTO004)	0 - 5m	2023-10-16	2024-10-15
		Straight ruler (TNRDTO048)	0 - 300mm	2024-03-18	2025-03-17
10.17	Fire test	PV module combustion test system (GF-112-1)	—	2024-05-13	2025-05-12
		Electronic balance (GF-190)	—	2023-10-31	2024-10-30
		Hygrothermograph (GF-270-3)	—	2023-11-06	2024-11-05
		Mechanical stopwatch (GF-120)	—	2023-09-18	2024-09-17
		Electrothermal blowing dry box (GF-112-8)	—	2023-12-21	2024-12-20
		Handheld anemometer (GF-112-2)	—	2024-05-19	2025-05-18

National Photovoltaic Products Quality Supervision and Inspection Center (Attached to Chengdu Institute of Product Quality Inspection Co., Ltd.)

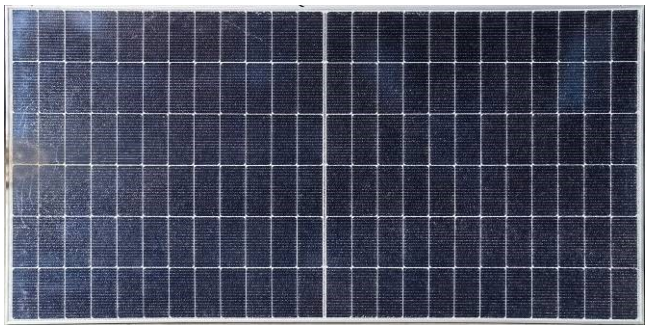
Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
10.2	Visual inspection	Luminometer (Z10S06102)	0-20000lx	2023-09-25	2024-09-25
10.3	Performance at STC	AAA Long Pulse Simulator (Z10315800)	100 - 1400 W/m^2	2023-09-12	2024-09-11
10.4	Maximum power determination	AAA Long Pulse Simulator (Z10315800)	100 - 1400 W/m^2	2023-09-12	2024-09-11
10.6	Durability of markings	Electronic stopwatch (J30009100)	0 - 3600s	2023-02-22	2024-02-21
10.7	Sharp edge test	Edge edge detector (Z25032400)	0 - 10N	2023-10-07	2024-10-06
10.8	Bypass diode functionality test	AAA Long Pulse Simulator (Z10315800)	100 - 1400 W/m^2	2023-09-12	2024-09-11
10.9	Accessibility test	Digital multimeter (Z30010500)	0-1000V	2023-04-07	2024-04-06
		Test finger (Z25032500)	0 - 10N	2023-10-08	2024-10-07
10.11	Continuity test of equipotential bonding	DC Power Supply (Z25032000)	0 - 60V 0 - 100A	2023-04-07	2024-04-06
10.12	Impulse voltage test	Impulse voltage generator (Z30111400)	0 - 20kV	2023-10-25	2024-10-24
		High pressure probe (Z10289701)	N/A	2023-09-25	2024-09-24
		Digital oscilloscope (Z10289700)	N/A	2023-09-26	2024-09-25
10.13	Insulation test	Withstand voltage tester (Z30233600)	0 - 12 kV 0.1MΩ - 50GMΩ	2023-12-18	2024-12-17
10.14	Wet leakage current test	Withstand voltage tester (Z30233600)	0 - 12 kV 0.1MΩ - 50GMΩ	2023-12-18	2024-12-17
		Conductive meter (Z10S05002)	20 - 2000 μS/cm	2023-09-26	2024-09-25
		Thermometer (J10S01600)	0 - 100 ℃	2023-04-14	2024-04-13

10.15	Temperature test	AAA steady state simulator measurement system (Z10S00800)	200 - 1300 W/m^2	2023-12-07	2024-12-06
10.16	Hot-spot endurance test	AAA steady state simulator measurement system (Z10S00800)	200 - 1300 W/m^2	2023-12-07	2024-12-06
10.18	Ignitability test	Full scale component burnable testing machine (Z30138100)	N/A	N/A	N/A
		Cronometro (J30009100)	N/A	2023-02-22	2024-02-21
		straight steel ruler (J30075200)	0-300mm	2023-04-07	2024-04-06
10.19	Bypass diode thermal test	High and low temperature alternating humidity heat environment test chamber (Z10S03800)	-45 - 90 ℃ 10% - 98%RH	2023-09-22	2024-09-21
		Pulse DC Power Supply (Z30134700)	N/A	2023-04-07	2024-04-06
		Current probe (Z30139900)	N/A	2023-09-26	2024-09-25
		Data collector (Z10S00902)	N/A	2023-04-11	2024-04-10
		Digital oscilloscope (Z10289700)	N/A	2023-09-26	2024-09-25
10.20	Reverse current overload test	DC power supply (Z30232100)	0 - 80 V 0 - 60 A	2023-10-30	2024-10-29
10.21	Module breakage test	Impact tester (Z10S05300)	45.5 kg	N/A	N/A
10.23	Static mechanical load test	Large scale dynamic mechanical load testing machine (Z10315900)	0 - 200 (kg)	2023-09-18	2024-09-17
10.26	Materials creep test	High and low temperature alternating humidity and heat environment test chamber (Z25031400)	-50 - 120 ℃	2023-09-22	2024-09-21
10.27	Robustness of terminations test	Digital dynamometer (Z10S06106)	0 - 200 N	2023-09-28	2024-09-27
		Weight (Z10290701)	40 N	2023-03-09	2024-03-08

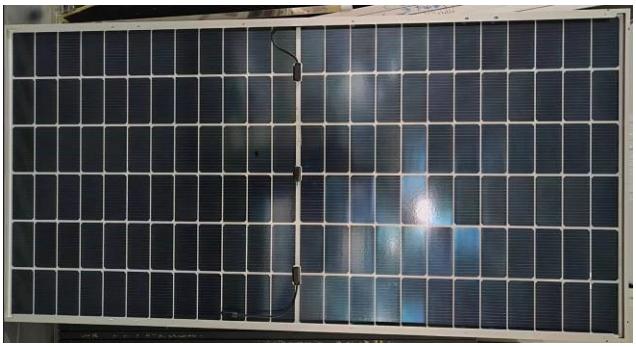
10.28	Thermal cycling test	High and low temperature alternating humidity heat environment test chamber (Z10S03800)	-50 - 100 ℃ 0 - 98%RH	2023-09-22	2024-09-21
		Current Continuity Monitoring System (Z25032800)	N/A	2023-08-23	2024-08-22
		Weight (G30213600)	500g	N/A	N/A
10.29	Humidity freeze test	High and low temperature alternating humidity and heat environment test chamber (Z25031400)	-70 - 105 ℃	2023-09-22	2024-09-21
		Current Continuity Monitoring System (Z25032800)	N/A	2023-08-23	2024-08-22
10.30	Damp heat test	Constant temperature and humidity chamber (Z10S03600)	0 - 95 ℃ 0 - 98%RH	2023-09-22	2024-09-21
10.31	UV test	Accelerated UV wet heat test chamber (Z25031700)	280 - 400 nm	2023-11-28	2024-11-27
10.32	Cold conditioning	High and low temperature alternating humidity and heat environment test chamber (Z25031500)	-50 - 120 ℃	2023-09-22	2024-09-21
10.33	Dry heat conditioning	High and low temperature alternating humidity and heat environment test chamber (Z25031500)	-50 - 120 ℃	2023-09-22	2024-09-21

Annex 3: Photos of Fire Test

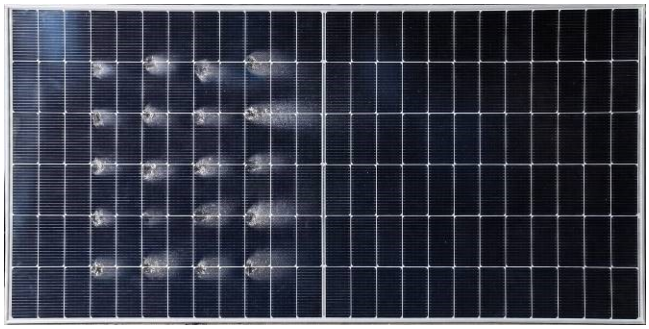
Module type: TWMND-72HD570 (BOM4)



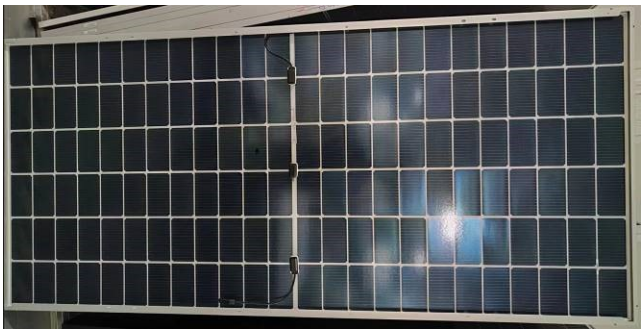
Sample# 4-fire 1: Spread of flame test (front)



Sample# 4-fire 1: Spread of flame test (back)



Sample# 4-fire 3: Burning brand test (front)



Sample #4-fire 3: Burning brand test (back)

Module type: TWMND-72HD570 (BOM5)

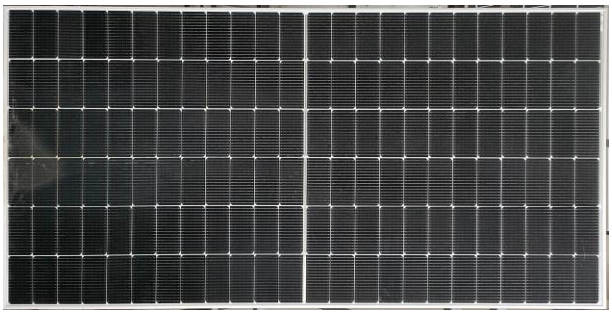
Sample# 5-fire 1: Spread of flame test (front)

Sample# 5-fire 1: Spread of flame test (back)

Sample# 5-fire 3: Burning brand test (front)

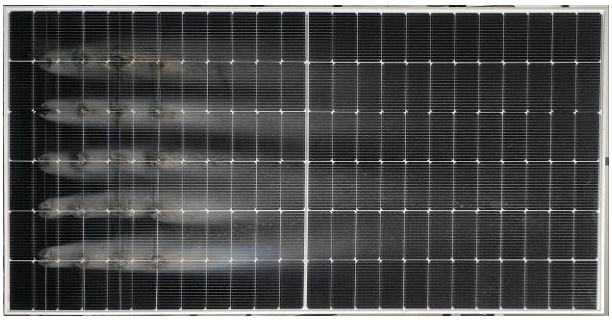
Sample # 5-fire 3: Burning brand test (back)

Module type: TWMND-72HD570 (BOM6)



Sample# 6-fire 1: Spread of flame test (front)

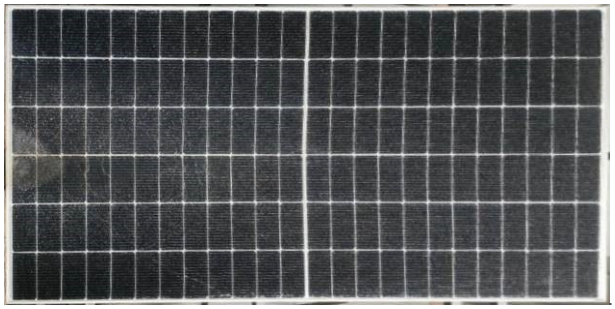
Sample# 6-fire 1: Spread of flame test (back)



Sample# 6-fire 3: Burning brand test (front)

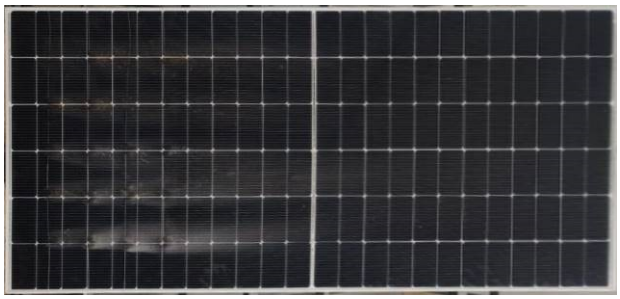
Sample #6-fire 3: Burning brand test (back)

Module type: TWMND-72HD570 (BOM7)



Sample# 7-fire 1: Spread of flame test (front)

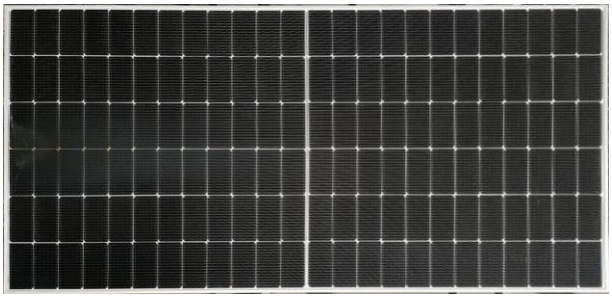
Sample# 7-fire 1: Spread of flame test (back)



Sample# 7-fire 3: Burning brand test (front)

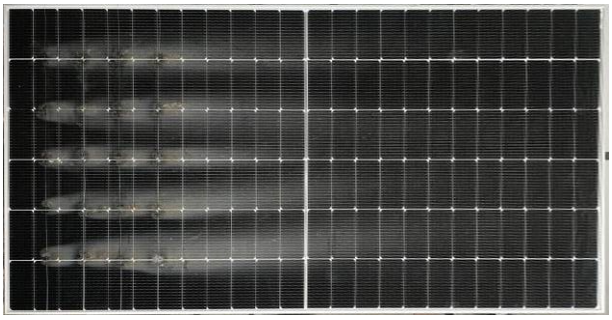
Sample # 7-fire 3: Burning brand test (back)

Module type: TWMND-72HD570 (BOM8)



Sample# 8-fire 1: Spread of flame test (front)

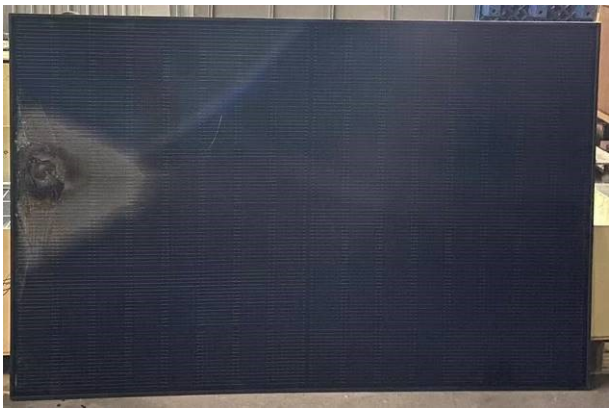
Sample# 8-fire 1: Spread of flame test (back)



Sample# 8-fire 3: Burning brand test (front)

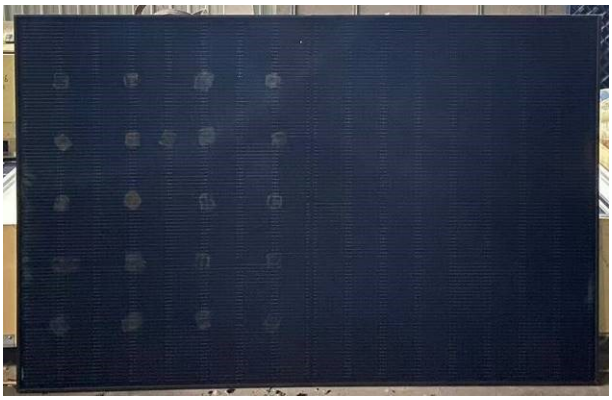
Sample # 8-fire 3: Burning brand test (back)

Module type: TWMNH-48HC435 (BOM9)

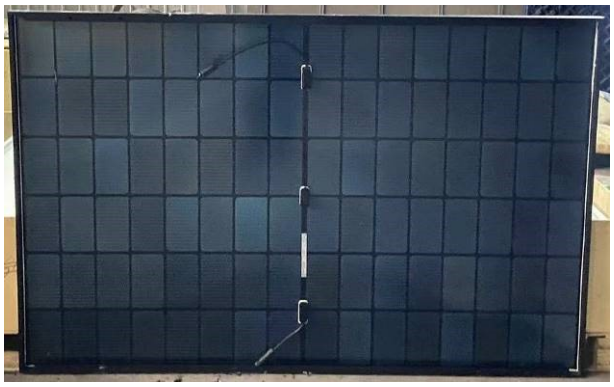


Sample# 9-fire 1: Spread of flame test (front)

Sample# 9-fire 1: Spread of flame test (back)

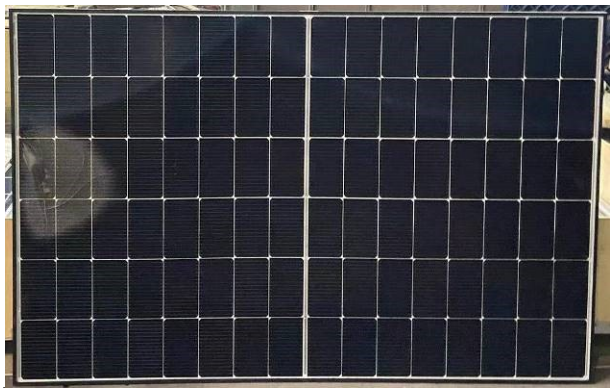


Sample# 9-fire 3: Burning brand test (front)



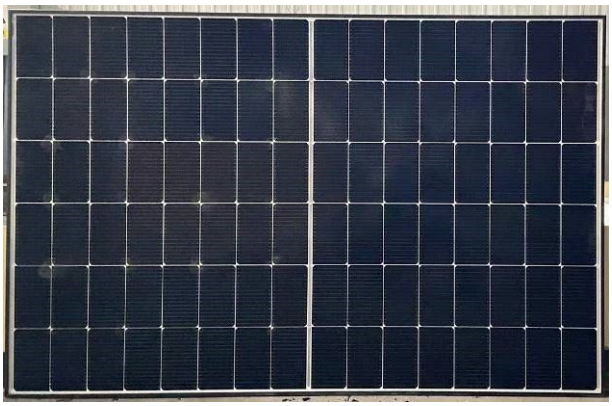
Sample #9-fire 3: Burning brand test (back)

Module type: TWMNH-48HD435 (BOM10)



Sample# 10-fire 1: Spread of flame test (front)

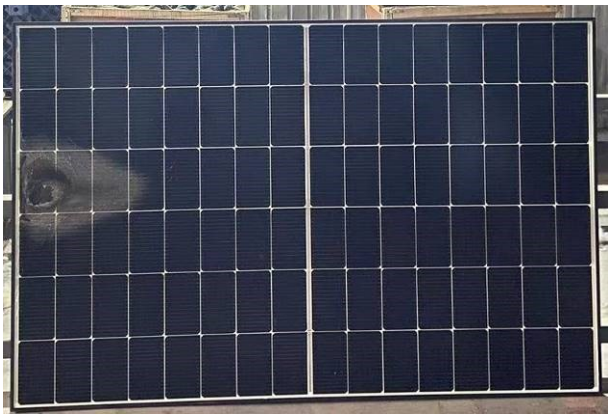
Sample# 10-fire 1: Spread of flame test (back)



Sample# 10-fire 3: Burning brand test (front)

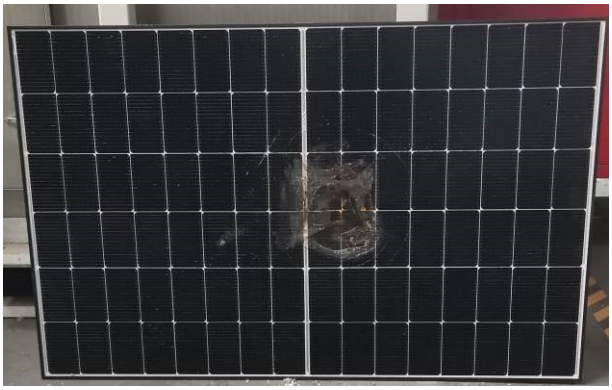
Sample # 10-fire 3: Burning brand test (back)

Module type: TWMNH-48HD435 (BOM11)



Sample# 11-fire 1: Spread of flame test (front)

Sample# 11-fire 1: Spread of flame test (back)

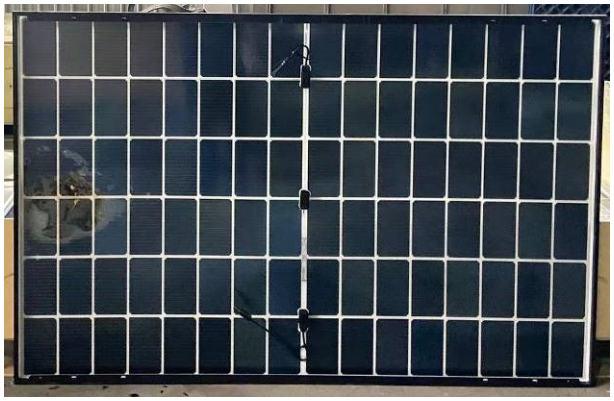


Sample# 11-fire 3: Burning brand test (front)

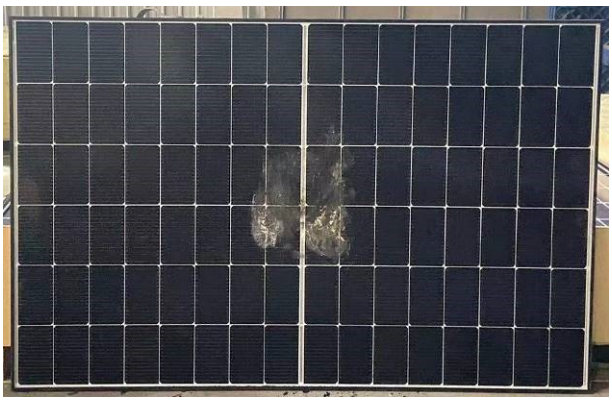
Sample # 11-fire 3: Burning brand test (back)

Module type: TWMNH-48HD435 (BOM12)

Sample# 12-fire 1: Spread of flame test (front)



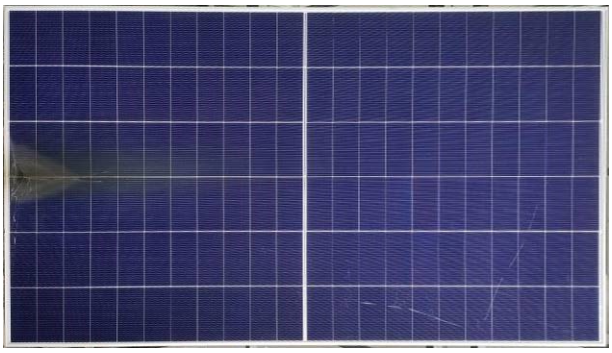
Sample# 12-fire 1: Spread of flame test (back)



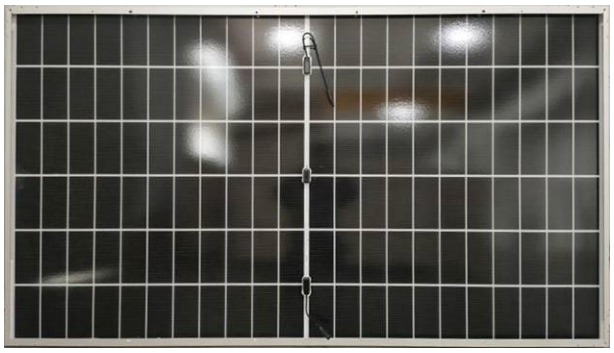
Sample# 12-fire 3: Burning brand test (front)

Sample # 12-fire 3: Burning brand test (back)

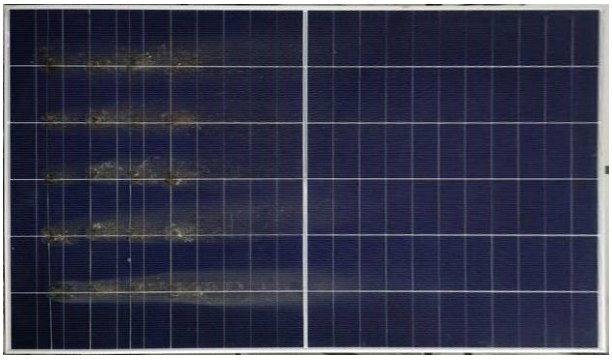
Module type: TWMHF-66HD715 (BOM14)



Sample# 11-fire 1: Spread of flame test (front)



Sample# 11-fire 1: Spread of flame test (back)



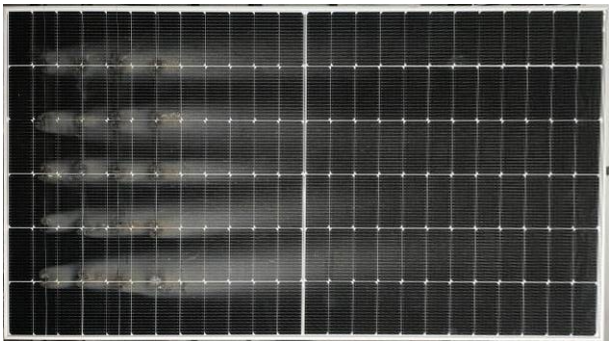
Sample# 11-fire 3: Burning brand test (front)

Sample #11-fire 3: Burning brand test (back)

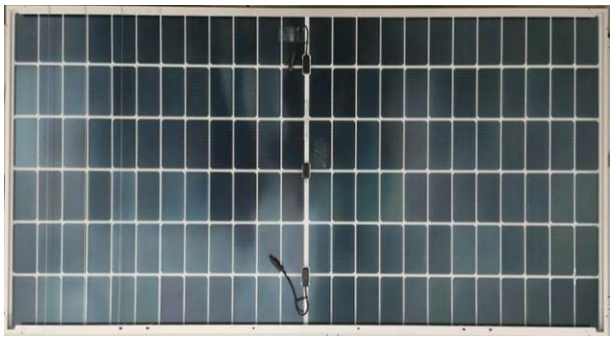
Module type: TWMND-72HD575 (BOM20)

Sample# 20-fire 1: Spread of flame test (front)

Sample# 20-fire 1: Spread of flame test (back)



Sample# 21-fire 3: Burning brand test (front)

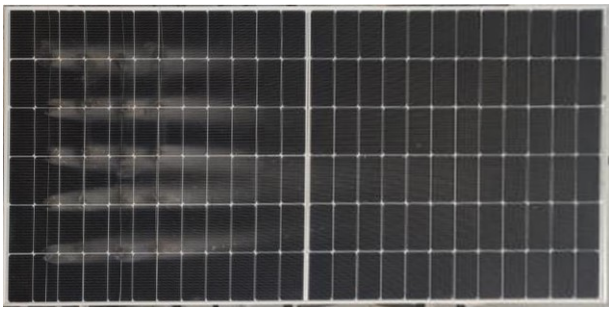


Sample #21-fire 3: Burning brand test (back)

Module type: TWMND-72HD575 (BOM21)

Sample# 21-fire 1: Spread of flame test (front)

Sample# 21-fire 1: Spread of flame test (back)



Sample# 21-fire 3: Burning brand test (front)

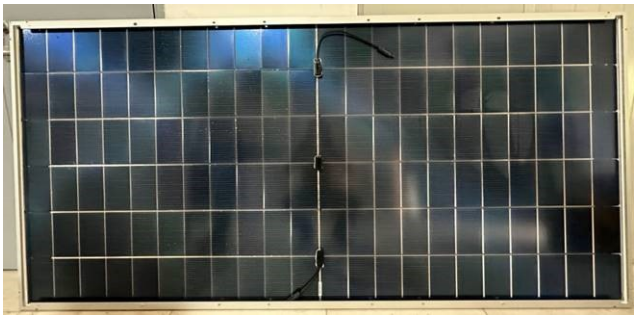
Sample# 21-fire 3: Burning brand test (back)

Module type: TWMNH-66HD615 (BOM22)

Sample# 22-fire 1: Spread of flame test (front)

Sample# 22-fire 1: Spread of flame test (back)

Sample# 22-fire 3: Burning brand test (front)



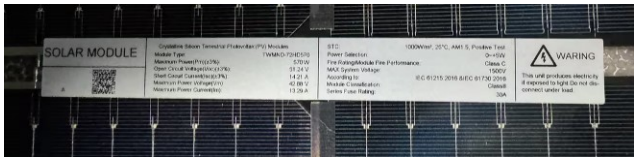
Sample# 22-fire 3: Burning brand test (back)

Annex 4: Sample Photos

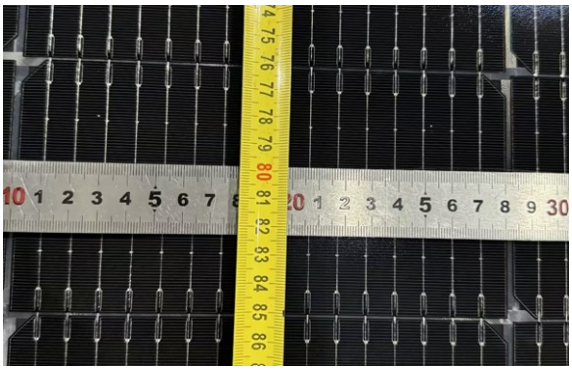
Module type: TWMND-72HD570 (BOM1)

Front overview

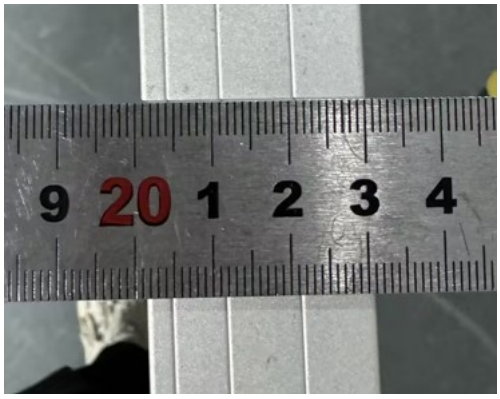
Back overview



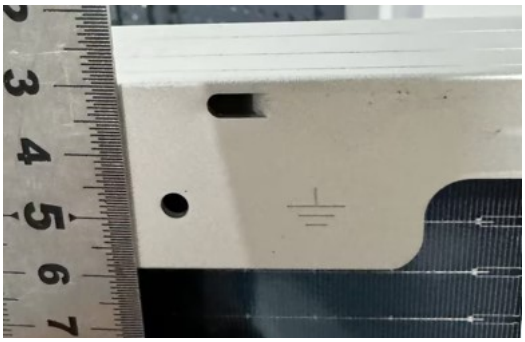
Label



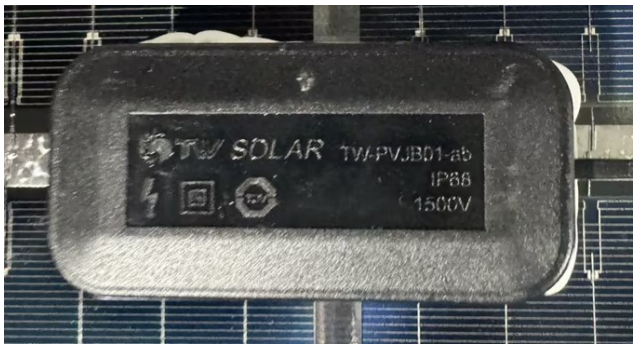
Solar cell



Frame



Grounding Mark

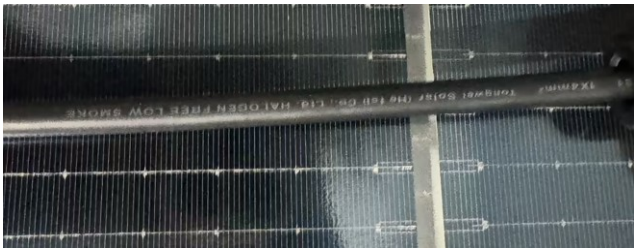


Junction box (TW-PVJB01-ab)

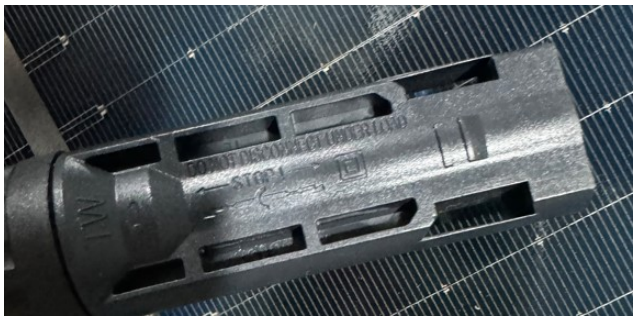
Junction box (opened)

N/A

Bypass diode (Junction box is potted)



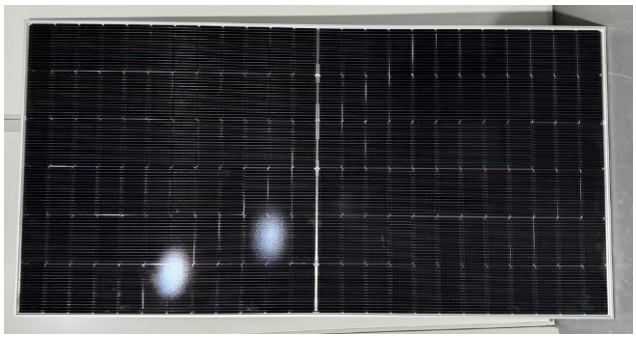
Cable (62930 IEC 1x4.0mm²)



Mark (Do not disconnect under load)

Connectors (TW-PVCON-01)

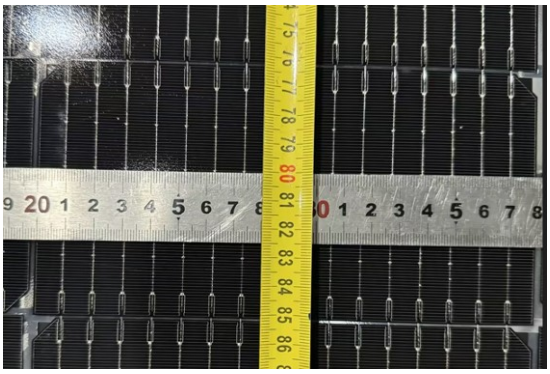
Module type: TWMND-72HD580 (BOM2)



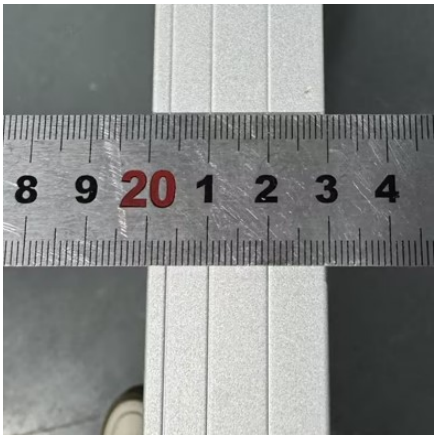
Front overview

Back overview

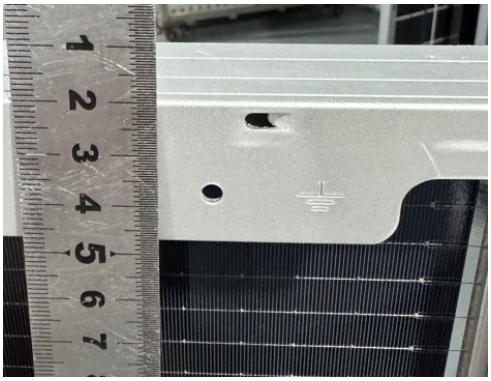
Label



Solar cell

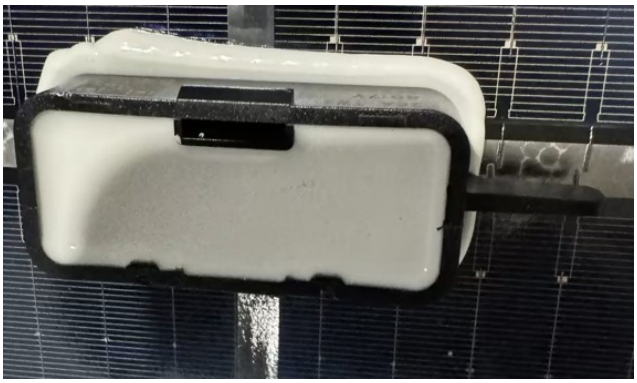


Frame



Grounding Mark

Junction box (TW-PVJB01-ab)



Junction box (opened)

N/A

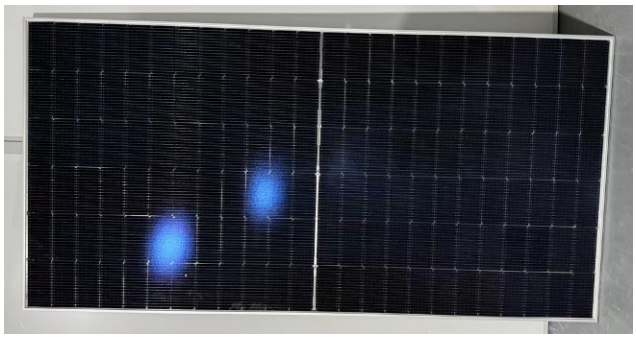
Bypass diode (Junction box is potted)

Cable (62930 IEC 1x4.0mm^2)

Mark (Do not disconnect under load)

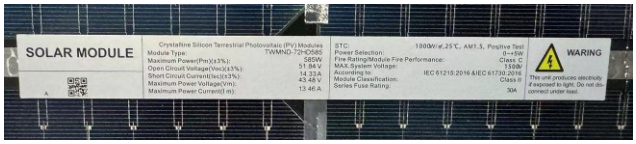
Connectors (TW-PVCON-01)

Module type: TWMND-72HD585 (BOM3)

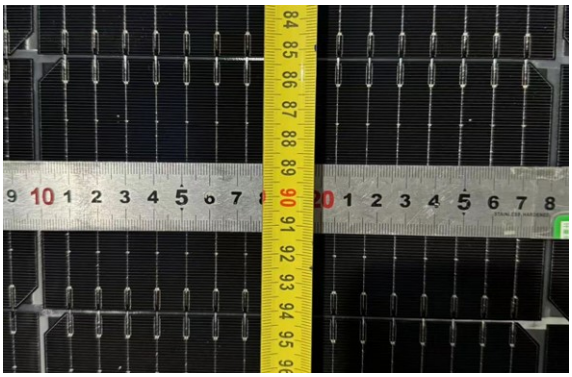


Front overview

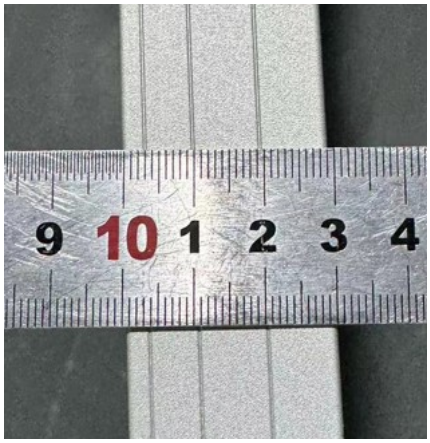
Back overview



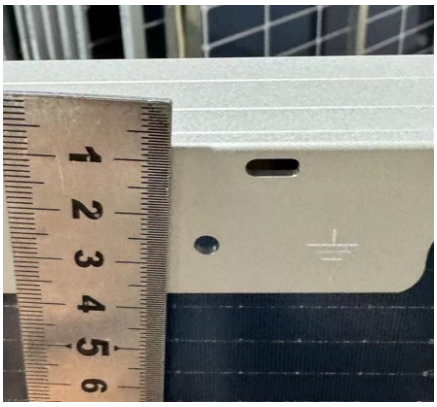
Label



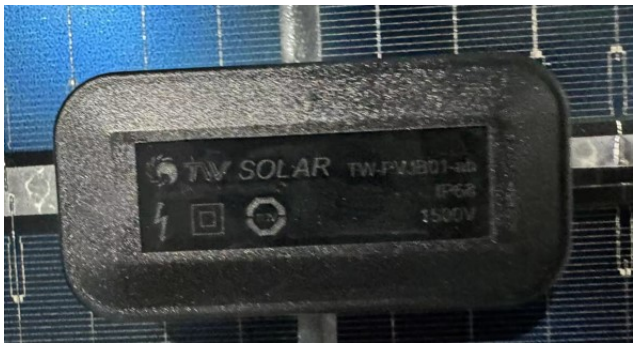
Solar cell



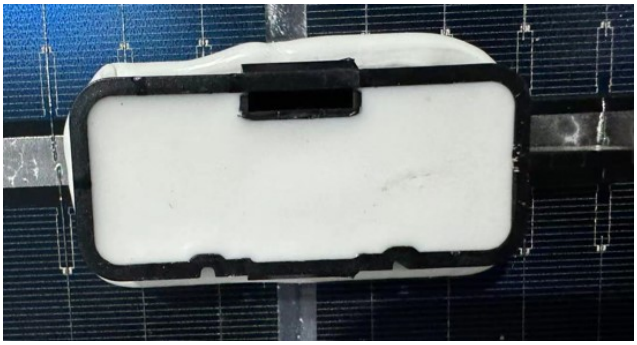
Frame



Grounding Mark



Junction box (TW-PVJB01-ab)



Junction box (opened)

N/A

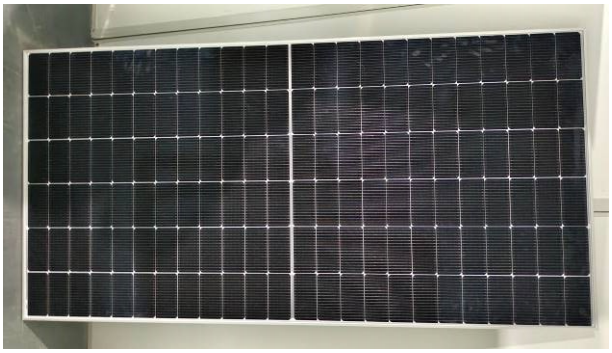
Bypass diode (Junction box is potted)

Cable (62930 IEC 1x4.0mm²)

Mark (Do not disconnect under load)

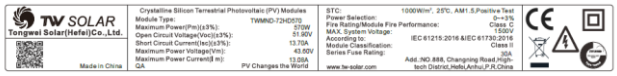
Connectors (TW-PVCON-01)

Module type: TWMND-72HD570 (BOM4)

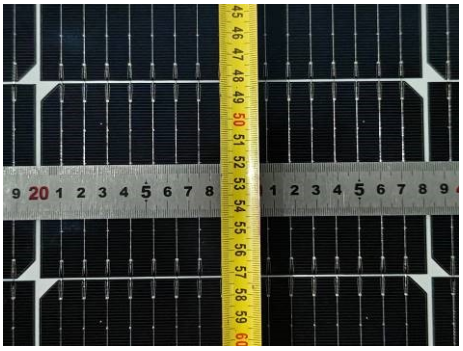


Front overview

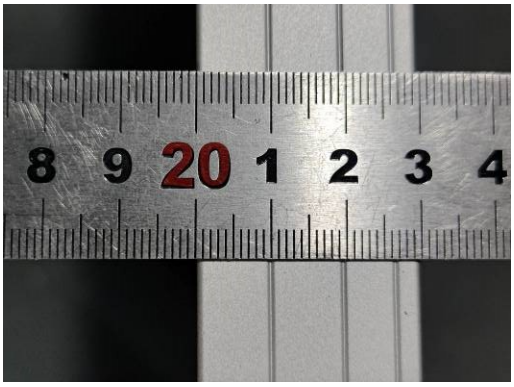
Back overview



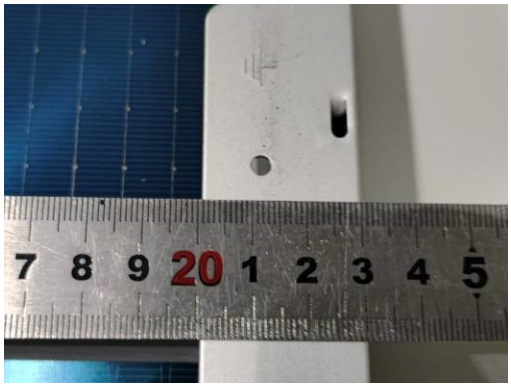
Label



Solar cell



Frame



Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A

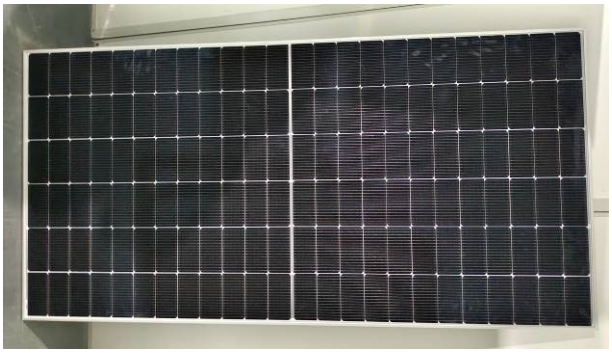
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

Mark (Do not disconnect under load)

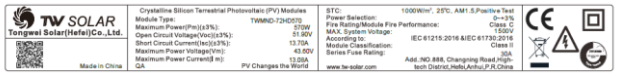
Connectors (PV-ZH202B)

Module type: TWMND-72HD570 (BOM5)



Front overview

Back overview



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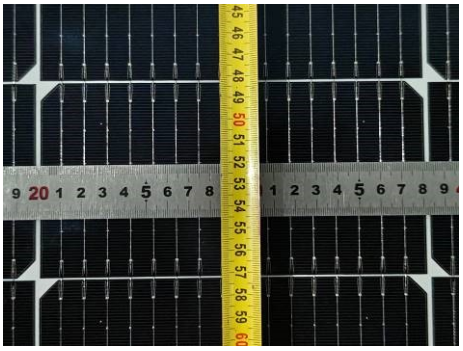
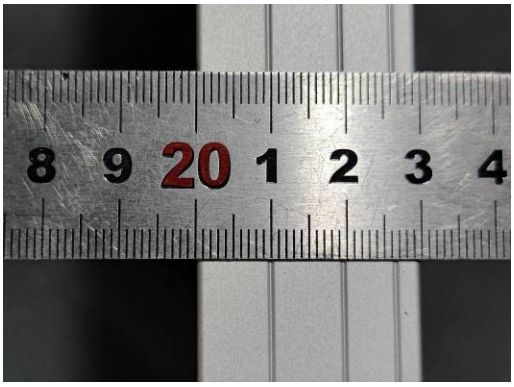


Solar cell



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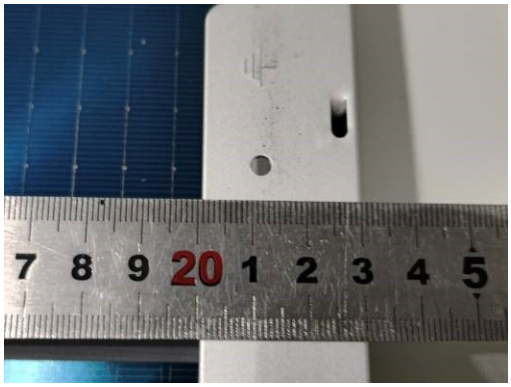


Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A

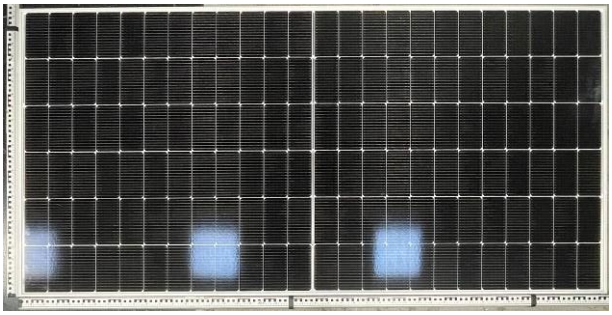
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

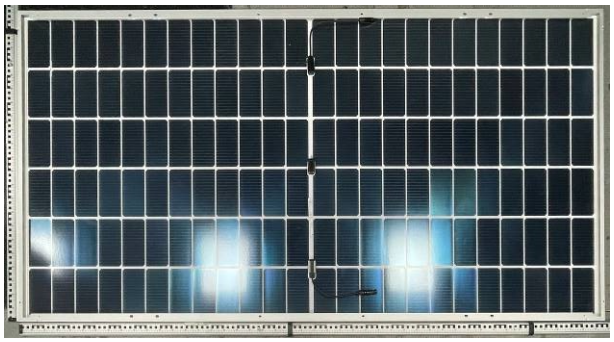
Mark (Do not disconnect under load)

Connectors (PV-ZH202B)

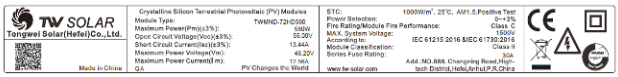
Module type: TWMND-72HD570 (BOM6)



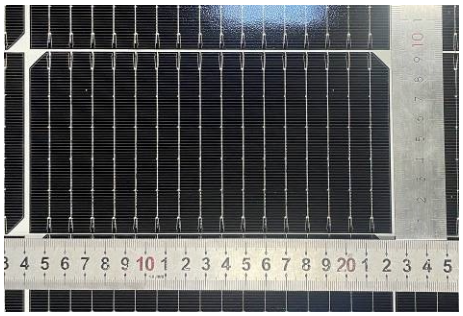
Front overview



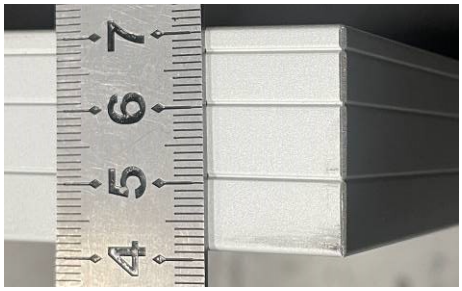
Back overview



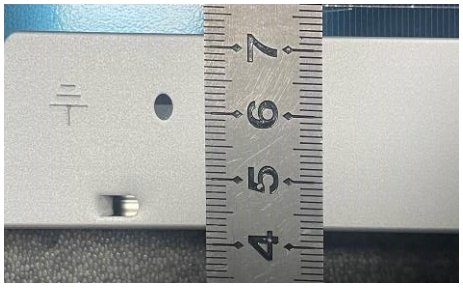
Label



Solar cell



Frame



Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A

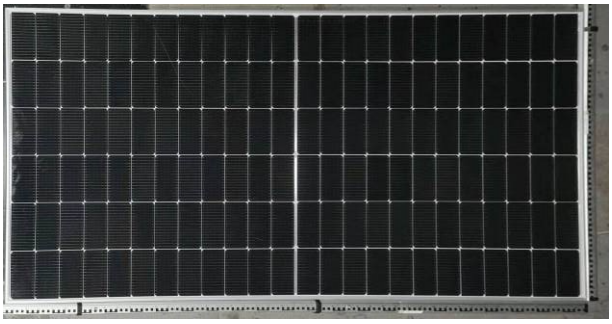
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

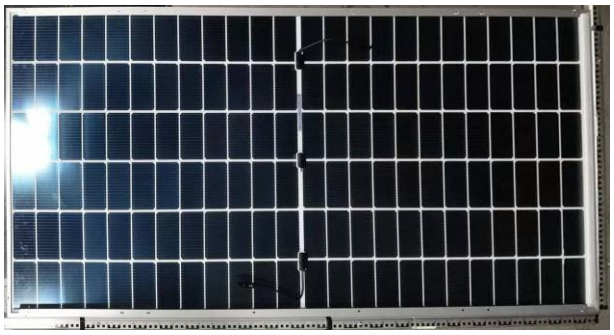
Mark (Do not disconnect under load)

Connectors (TW-PVCON-01)

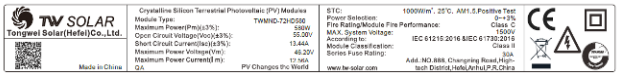
Module type: TWMND-72HD570 (BOM7)



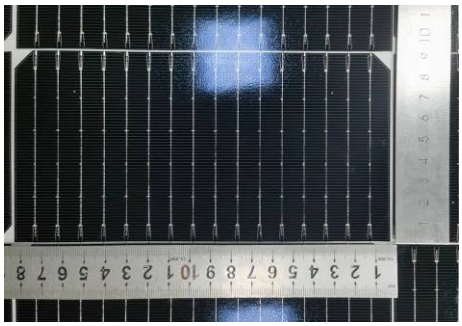
Front overview



Back overview

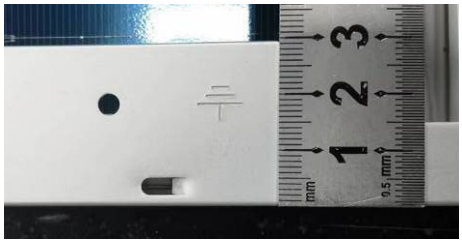


Label



Solar cell

Frame



Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A

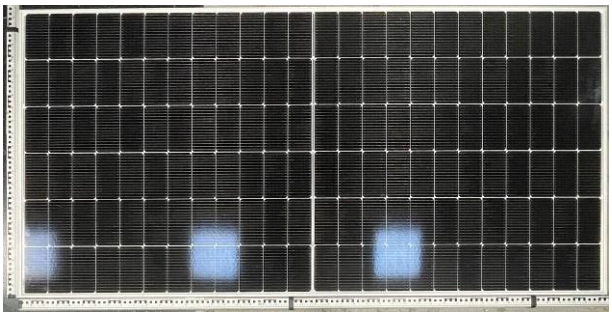
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

Mark (Do not disconnect under load)

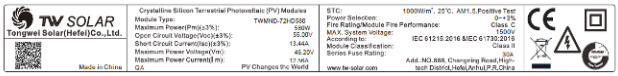
Connectors (TW-PVCON-01)

Module type: TWMND-72HD570 (BOM8)

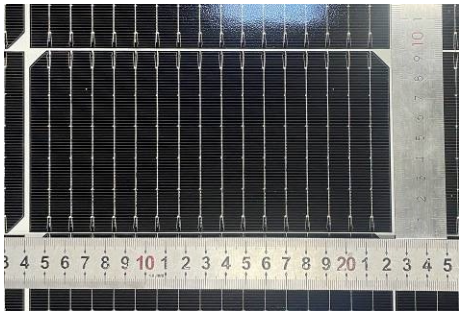


Front overview

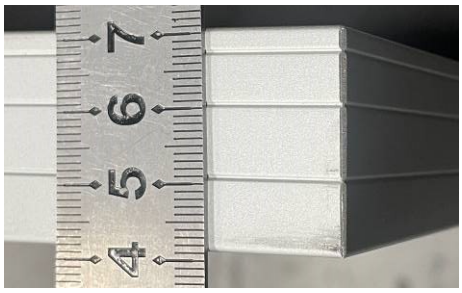
Back overview



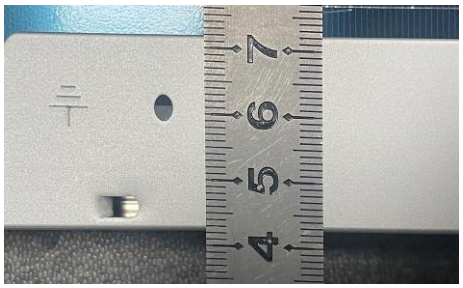
Label



Solar cell



Frame



Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A

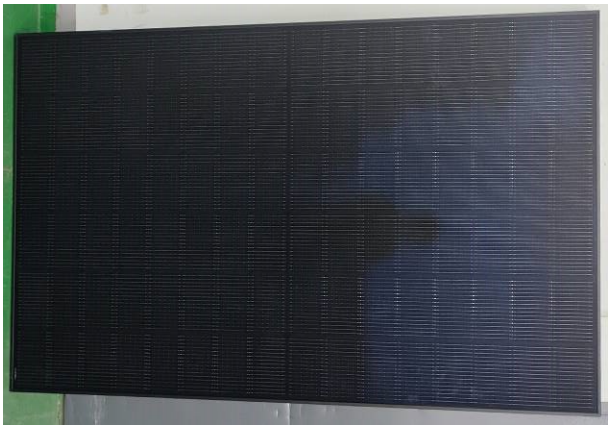
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

Mark (Do not disconnect under load)

Connectors (TW-PVCON-01)

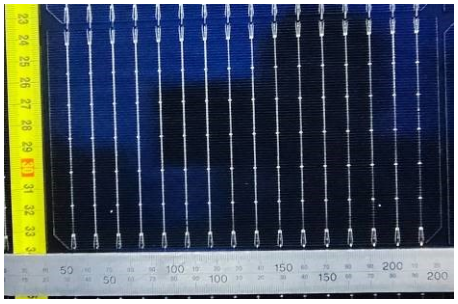
Module type: TWMNH-48HC435 (BOM9)



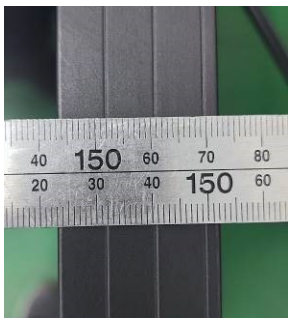
Front overview

Back overview

Label



Solar cell



Frame

Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A

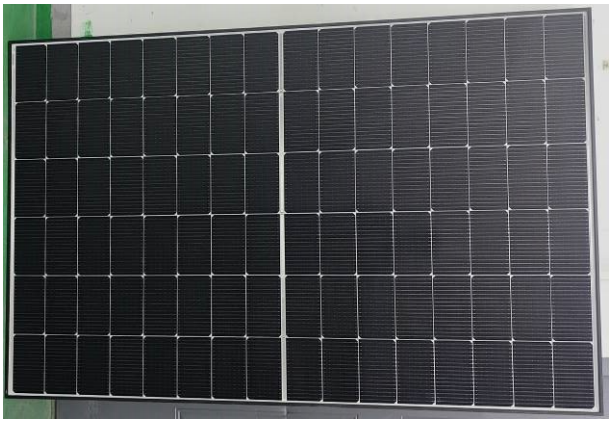
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

Mark (Do not disconnect under load)

Connectors (TW-PVCON-01)

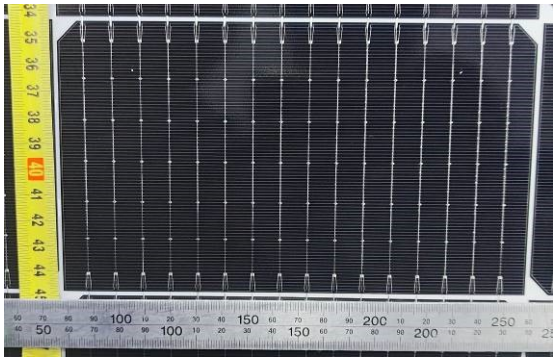
Module type: TWMNH-48HD435 (BOM10)



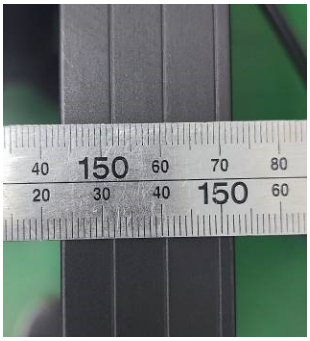
Front overview

Back overview

Label



Solar cell



Frame

Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A

Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

Mark (Do not disconnect under load)

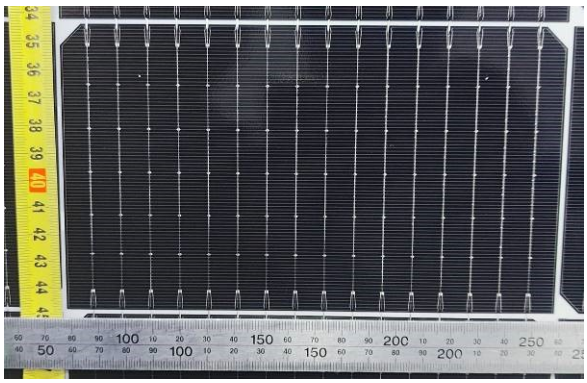
Connectors (TW-PVCON-01)

Module type: TWMNH-48HD435 (BOM11)

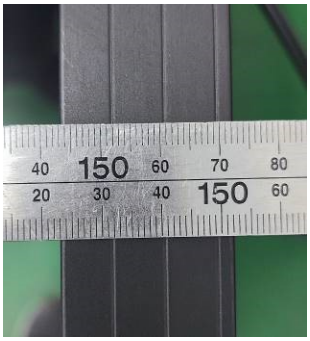
Front overview

Back overview

Label



Solar cell



Frame

Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A

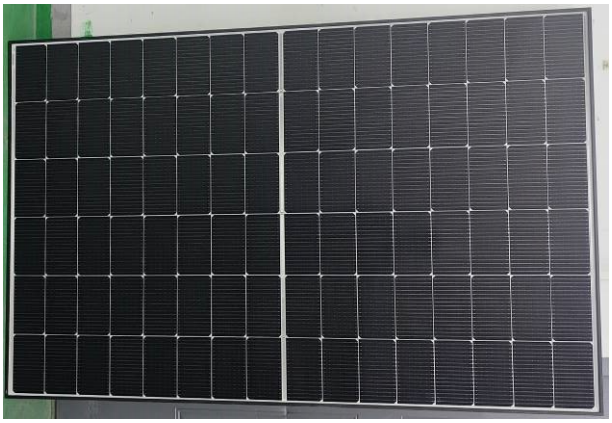
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

Mark (Do not disconnect under load)

Connectors (TW-PVCON-01)

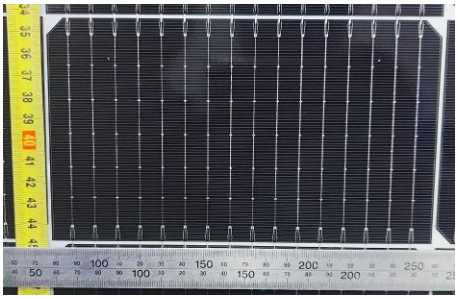
Module type: TWMNH-48HD435 (BOM12)



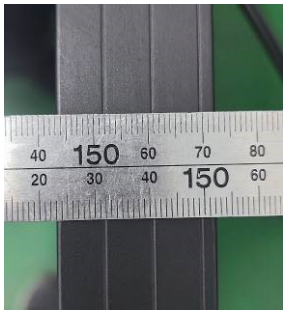
Front overview

Back overview

Label



Solar cell



Frame

Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A

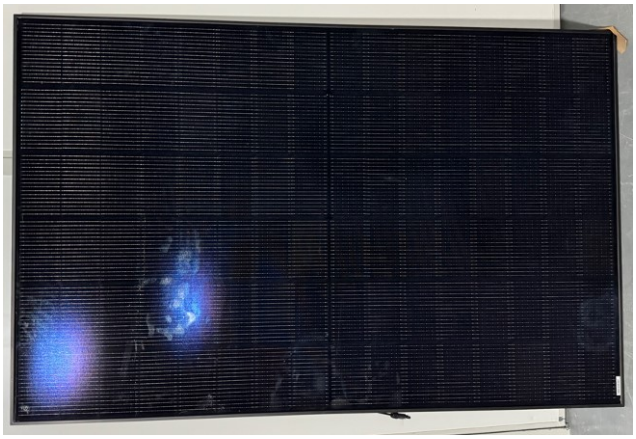
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

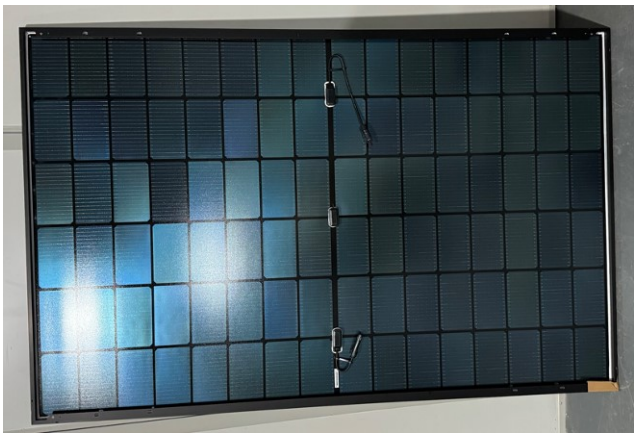
Mark (Do not disconnect under load)

Connectors (TW-PVCON-01)

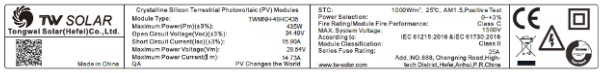
Module type: TWMNH-48HC435 (BOM13)



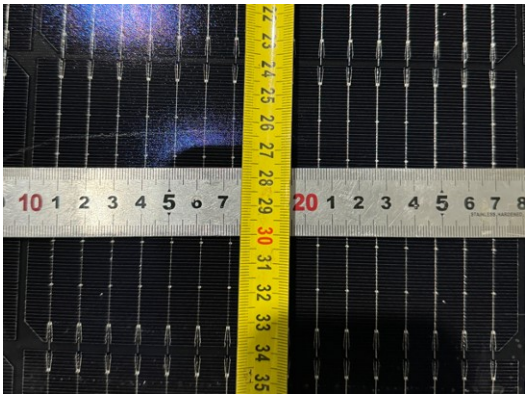
Front overview



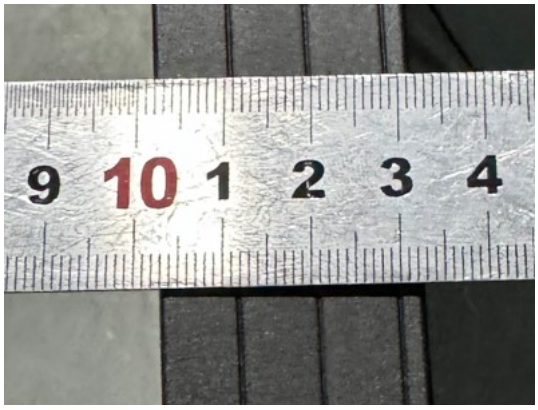
Back overview



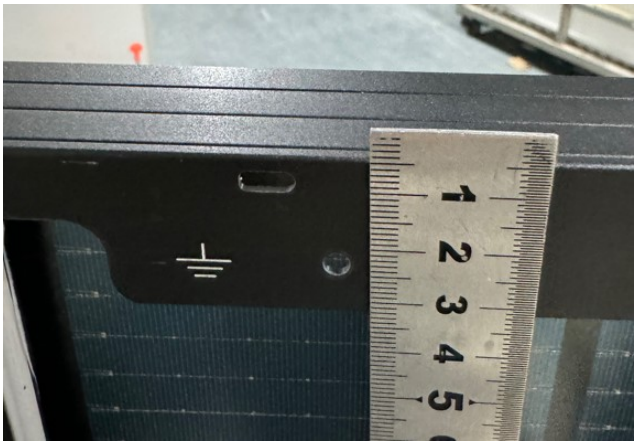
Label



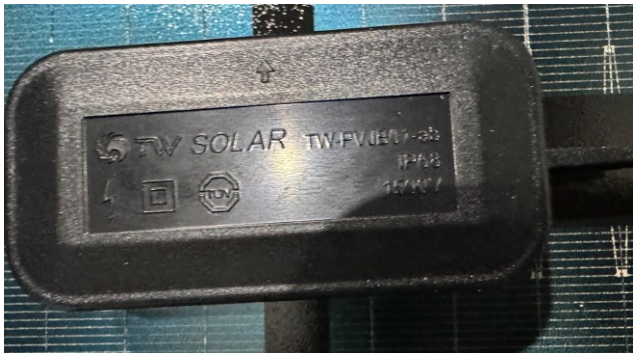
Solar cell



Frame



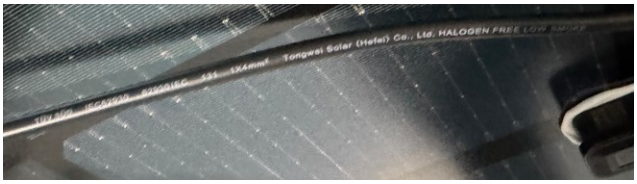
Grounding Mark



Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A



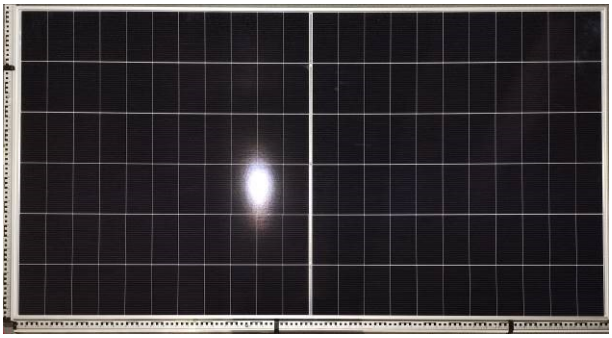
Bypass diode (Junction box is potted)

Cable (62930 IEC 1x4.0mm²)

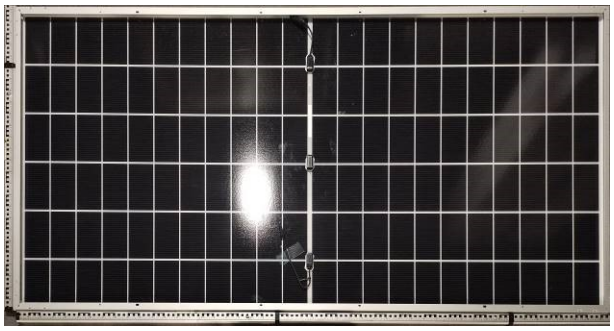
Mark (Do not disconnect under load)

Connectors (TW-PVCON-01)

Module type: TWMHF-66HD715 (BOM14)

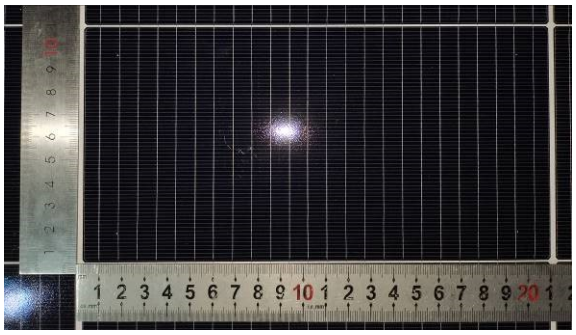


Front overview

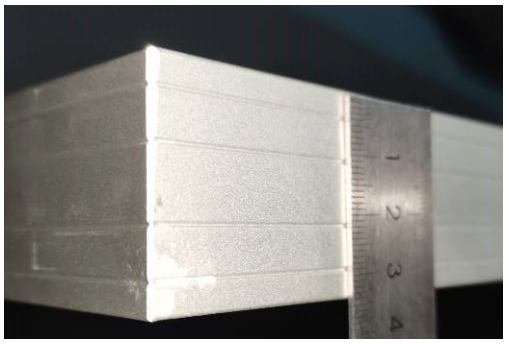


Back overview

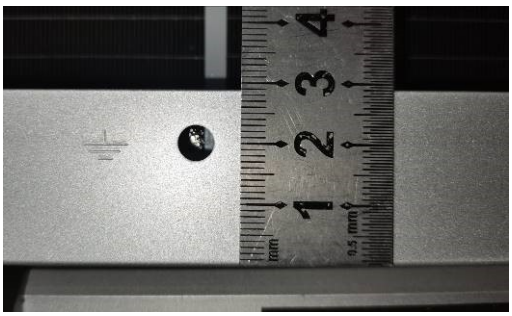
Label



Solar cell



Frame

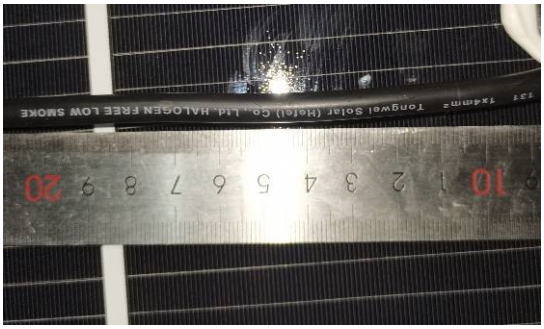


Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A



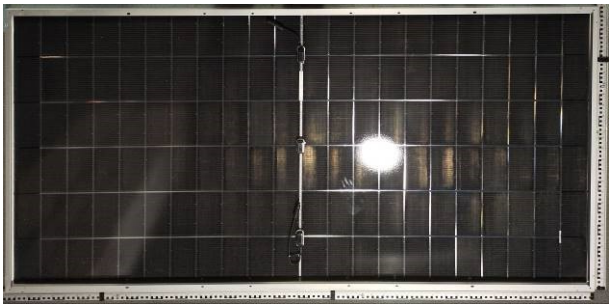
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

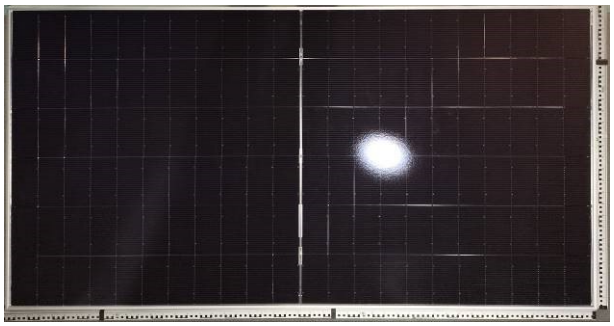
Mark (Do not disconnect under load)

Connectors (TW-PVCON-01)

Module type: TWMHF-66HD715 (BOM15)

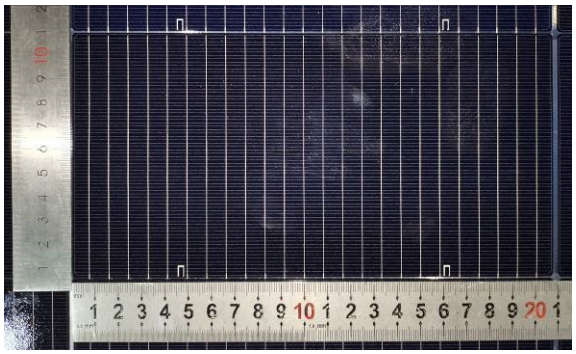


Front overview

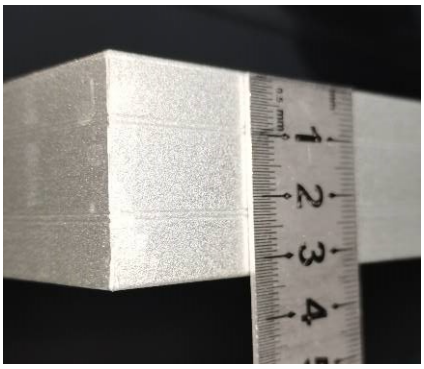


Back overview

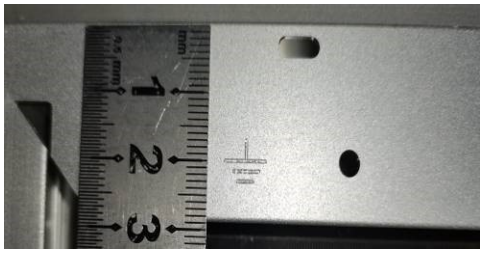
Label



Solar cell



Frame

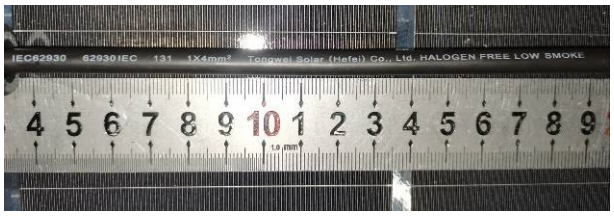


Grounding Mark

Junction box (PV-ZH011C-5)

Junction box (opened)

N/A



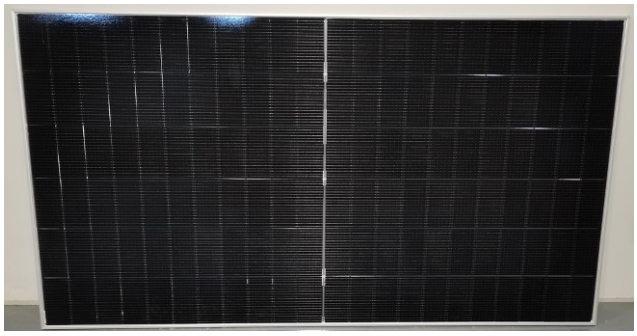
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

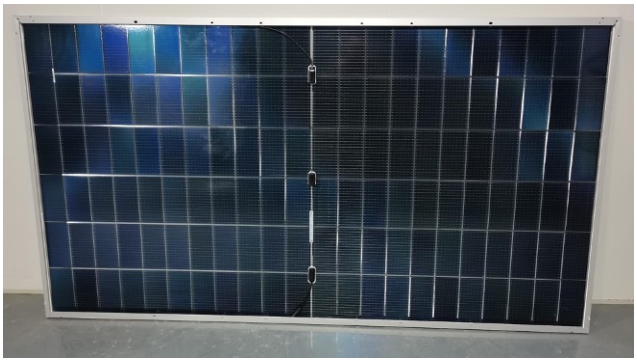
Mark (Do not disconnect under load)

Connectors (TW-PVCON-01)

Module type: TWMNF-66HD705 (BOM16)

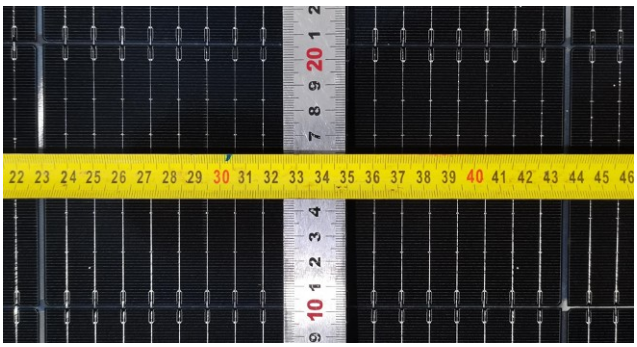


Front overview

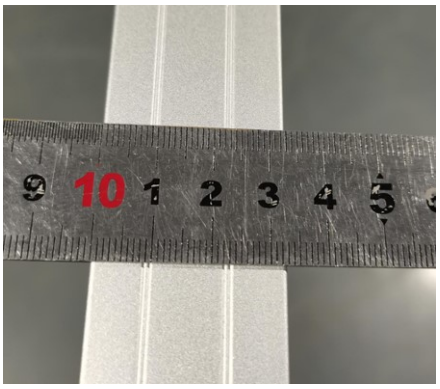


Back overview

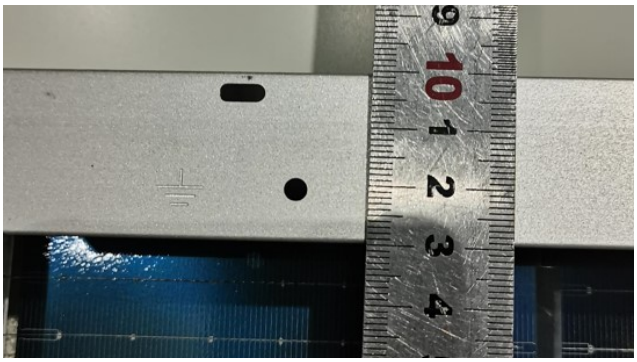
Label



Solar cell



Frame



Grounding Mark

Junction box (PV-ZH011C-5)

Junction box (opened)

N/A

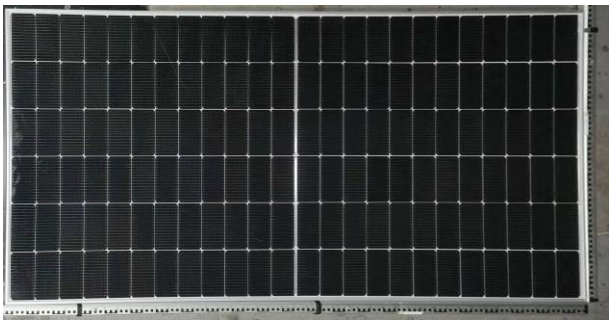
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4.0mm²)

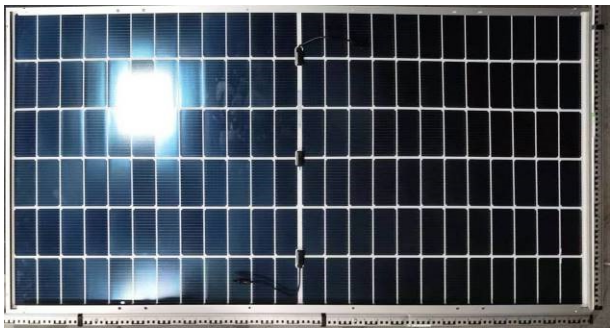
Mark (Do not disconnect under load)

Connectors (TW-PVCON-01)

Module type: TWMND-72HD575 (BOM20)

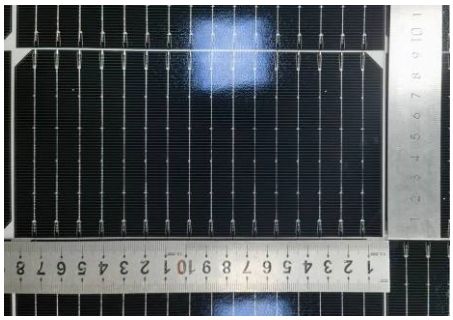


Front overview

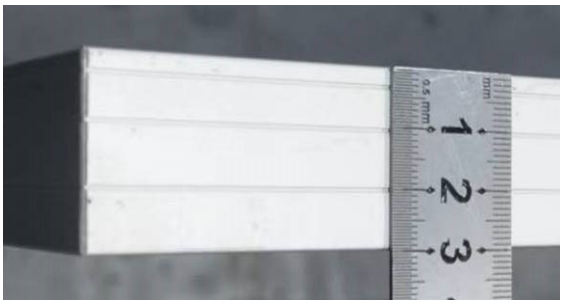


Back overview

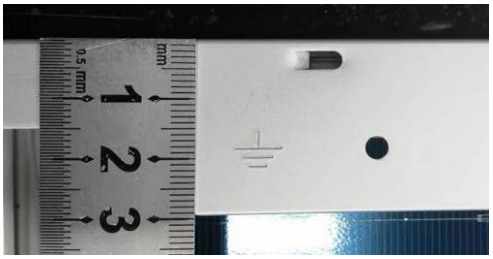
Label



Solar cell

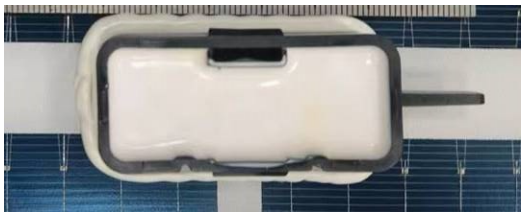


Frame



Grounding Mark

Junction box (TW-PVJB01-ab)



Junction box (opened)

N/A

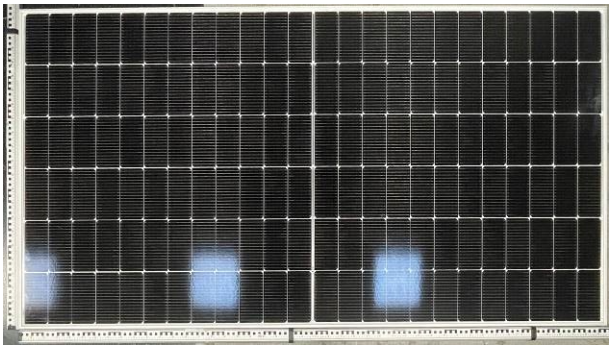
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4mm²)

Mark (Do not disconnect under load)

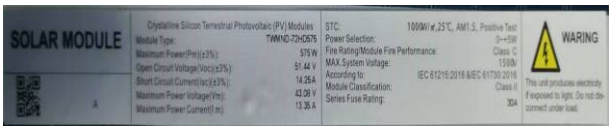
Connectors (PV-ZH202B)

Module type: TWMND-72HD575 (BOM21)

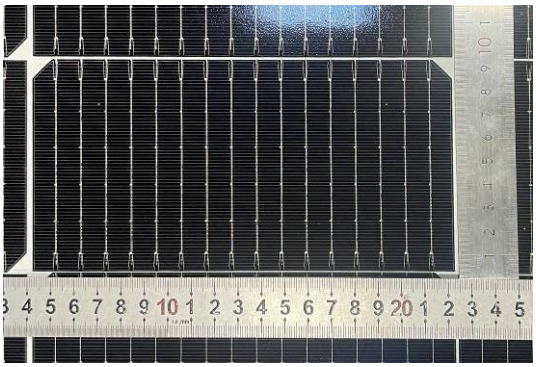


Front overview

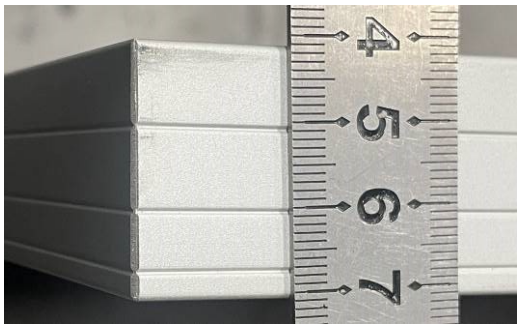
Back overview



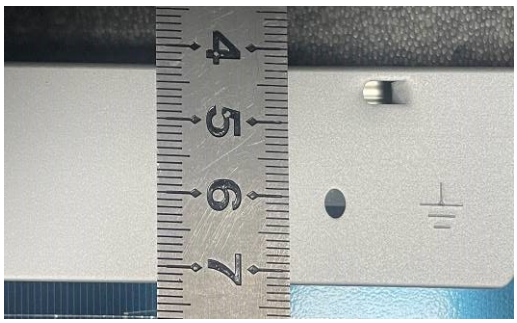
Label



Solar cell



Frame



Grounding Mark

Junction box (TW-PVJB01-ab)

Junction box (opened)

N/A

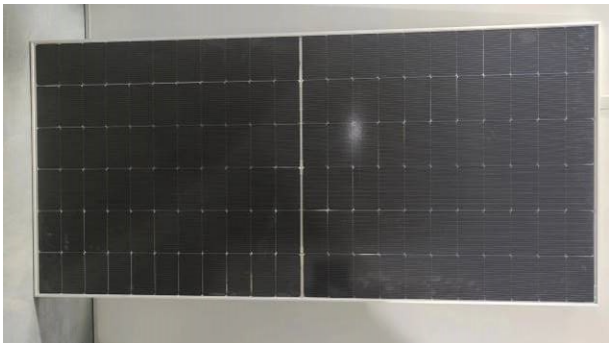
Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4mm²)

Mark (Do not disconnect under load)

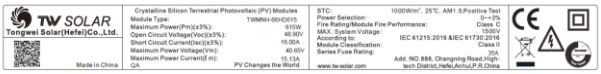
Connectors (PV-ZH202B)

Module type: TWMNH-66HD615 (BOM22)

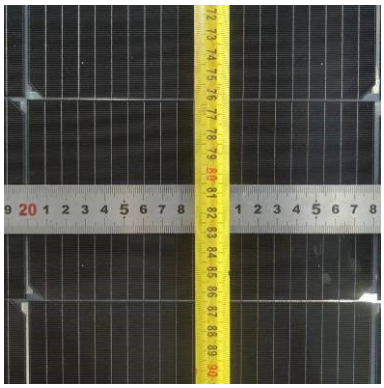


Front overview

Back overview

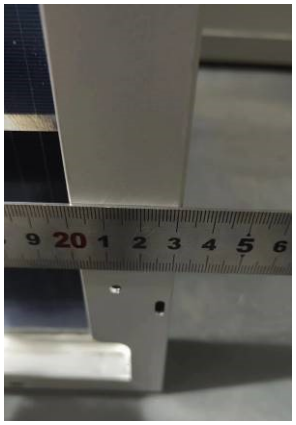


Label



Solar cell

Frame



Grounding Mark

Junction box (TW-PVJB01-ab)

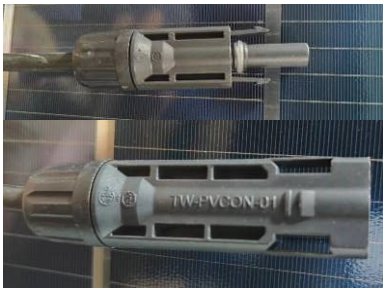
Junction box (opened)

N/A

Bypass diode (Junction box is potted)

Cable (62930 IEC 131 1x4mm^2)

Mark (Do not disconnect under load)



Connectors (TW-PVCON01)

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