TÜV NORD (Hangzhou) Co., Ltd.

B502, No.9, JiuhuanRoad
Jinggan District, Hangzhou
China, 310019

Phone: +86 (0) 571 8538 6989
Fax: +86 (0) 571 8538 6986

hzpcert@tuv-nord.com
www.tuv-nord.com/cn

Test Report
No. 492011236.008

Photovoltaic Module Qualification
according to IEC / EN 61215-1, IEC / EN 61215-1-1,
IEC / EN 61215-2, IEC / EN 61730-1, IEC / EN 61730-2

Applicant: **Anhui Daheng Energy Technology Co., Ltd.**
6#A 1-3F, Gongtouxinglu Science & Technology Industrial Park
Luyang District, Hefei City, Anhui Province, P.R.China

File No.: PVP04006/21P-01

Designed: Sep 01. 2021 by: Bvan Zhang
(Project Engineer)

Reviewed: Sep. 01. 2021 by:
(Technical Certifier)

Applicant ..... :	**Anhui Daheng Energy Technology Co., Ltd.** 6#A 1-3F, Gongtouxinglu Science & Technology Industrial Park Luyang District, Hefei City, Anhui Province, P.R.China
Manufacturer ..... :	**Anhui Daheng Energy Technology Co., Ltd.** No.358,Tianhe Road, Luyang industrial Park Hefei City, Anhui Province, P.R. China
Order No. ..... :	QT-PVP04006/21P
Date of Application ..... :	05/06/2021
Product ..... :	Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
Module type(s) ..... :	**PV Modules with 6" Mono-crystalline Silicon Solar Cells:** 72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 72 cells: DHM72/FS-xxxW (xxx = 325 - 370, in increment of 5) 60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) 60 cells: DHM60/FS-xxxW (xxx = 275 - 310, in increment of 5) 72 cells: DHM72X-xxxW (xxx= 370 - 390, in increment of 5) 72 cells: DHM72X/FS-xxxW (xxx= 370 - 390, in increment of 5) 60 cells: DHM60X-xxxW (xxx= 310 - 325, in increment of 5) 60 cells: DHM60X/FS-xxxW (xxx= 310 - 325, in increment of 5) **PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: HCM72-xxxW (xxx = 350 - 390, in increment of 5) 144 cells: HCM72/FS-xxxW (xxx = 350 - 390, in increment of 5) 120 cells: HCM60-xxxW (xxx = 290 - 325, in increment of 5) 120 cells: HCM60/FS-xxxW (xxx = 290 - 325, in increment of 5) 156 cells: HCM78X9-xxxW (xxx = 415 - 455, in increment of 5) 156 cells: HCM78X9/FS-xxxW (xxx = 415 - 455, in increment of 5) 144 cells: HCM72X9-xxxW (xxx = 385 - 420, in increment of 5) 144 cells: HCM72X9/FS-xxxW (xxx = 385 - 420, in increment of 5) 120 cells: HCM60X9-xxxW (xxx = 320 - 350, in increment of 5) 120 cells: HCM60X9/FS-xxxW (xxx = 320 - 350, in increment of 5) 144 cells: DHM-72L9-xxxW (xxx = 430 - 465, in increment of 5) 144 cells: DHM-72L9/FS-xxxW (xxx = 430 - 465, in increment of 5) 144 cells: DHM-72L9/BF-xxxW (xxx = 430 - 465, in increment of 5) 144 cells: DHM-72L9/FS/BF-xxxW (xxx = 430 - 465, in increment of 5) 120 cells: DHM-60L9-xxxW (xxx = 360 - 385, in increment of 5) 120 cells: DHM-60L9/FS-xxxW (xxx = 360 - 385, in increment of 5) 120 cells: DHM-60L9/BF-xxxW (xxx = 360 - 385, in increment of 5) 120 cells: DHM-60L9/FS/BF-xxxW (xxx = 360 - 385, in increment of 5) **PV Modules with 7" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: DHM-72X10-xxxW (xxx = 525 - 555, in increment of 5) 144 cells: DHM-72X10/FS-xxxW (xxx = 525 - 555, in increment of 5) 144 cells: DHM-72X10/BF-xxxW (xxx = 525 - 555, in increment of 5) 144 cells: DHM-72X10/FS/BF-xxxW (xxx = 525 - 555, in increment of 5) 132 cells: DHM-66X10-xxxW (xxx = 485 - 505, in increment of 5)

	132 cells: DHM-66X10/FS-xxxW (xxx = 485 - 505, in increment of 5) 132 cells: DHM-66X10/BF-xxxW (xxx = 485 - 505, in increment of 5) 132 cells: DHM-66X10/FS/BF-xxxW (xxx = 485 - 505, in increment of 5) 120 cells: DHM-60X10-xxxW (xxx = 440 - 460, in increment of 5) 120 cells: DHM-60X10/FS-xxxW (xxx = 440 - 460, in increment of 5) 120 cells: DHM-60X10/BF-xxxW (xxx = 440 - 460, in increment of 5) 120 cells: DHM-60X10/FS/BF-xxxW (xxx = 440 - 460, in increment of 5) 108 cells: DHM-54X10-xxxW (xxx = 395 - 415, in increment of 5) 108 cells: DHM-54X10/FS-xxxW (xxx = 395 - 415, in increment of 5) 108 cells: DHM-54X10/BF-xxxW (xxx = 395 - 415, in increment of 5) 108 cells: DHM-54X10/FS/BF-xxxW (xxx = 395 - 415, in increment of 5) **PV Modules with 6" Poly-crystalline Silicon Solar Cells:** 72 cells: DHP72-xxxW (xxx= 310 - 335, in increment of 5) 60 cells: DHP60-xxxW (xxx= 260 - 280, in increment of 5) **PV Modules with 6" Half-cut Poly-crystalline Silicon Solar Cells:** 156 cells: HCP78X9-xxxW (xxx = 370 - 415, in increment of 5) 144 cells: HCP72X9-xxxW (xxx = 340 - 380, in increment of 5) 120 cells: HCP60X9-xxxW (xxx = 285 - 320, in increment of 5)
General Information • Maximum System Voltage.... : • Electrical Protection Class.... : • Fire Safety Class ..... :	 DC 1500V Class II Class C
Type of examination ..... :	Conformity testing with TÜV mark
Testing Period ..... :	06/30/2021 - 07/23/2021
Testing Laboratory..... :	**National Center of Supervision & Inspection on Solar Photovoltaic Products Quality (CPVT, Attached to Wuxi Institution of Supervision & Testing on Product Quality)** Suite A, 5 Xinhua Rd., WND, 214028 Wuxi Jiangsu, CHINA

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

The submitted test samples as described in the reports hereunder are in compliance with the requirements:
IEC / EN 61215-1:2016 “Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1: Test requirements”
IEC / EN 61215-1-1:2016 “Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules”
IEC 61215-2:2016 / EN 61215-2:2017 + AC:2017 + AC:2018 “Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures”
IEC 61730-1:2016 / EN IEC 61730-1:2018 + AC:2018 “Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction”
IEC 61730-2:2016 / EN IEC 61730-2:2018 + AC:2018 “Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing”

List of contents

History of certification	
File no. .....:	N/A
Certificate no.....:	50415065 0001
Date of issue ....:	09/18/2018
Report no. .....:	50119627.001
Module type(s) .:	**PV Modules with 6" Mono-crystalline Silicon Solar Cells:** 72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) **PV Modules with 6" Poly-crystalline Silicon Solar Cells:** 72 cells: DHP72-xxxW (xxx= 310 - 335, in increment of 5) 60 cells: DHP60-xxxW (xxx= 260 - 280, in increment of 5)
Description: .....:	Basic qualification by TUV Rheinland
Supplementary information: N/A	
File no. .....:	SHV02033/19
Certificate no.....:	44780 19 406749 - 170 & 44780 19 406749 - 171
Date of issue ....:	06/14/2019
Report no. .....:	492011236.001
Module type(s) .:	**PV Modules with 6" Mono-crystalline Silicon Solar Cells:** 72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) **PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: HCM72-xxxW (xxx = 350 - 390, in increment of 5) 120 cells: HCM60-xxxW (xxx = 290 - 325, in increment of 5) **PV Modules with 6" Poly-crystalline Silicon Solar Cells:** 72 cells: DHP72-xxxW (xxx= 310 - 335, in increment of 5) 60 cells: DHP60-xxxW (xxx= 260 - 280, in increment of 5)
Description: .....:	Based on certificate No. PV 50415065 issued by TUV Rheinland, extend to half-cut mono cell and a new set of junction box.
Supplementary information: N/A	
File no. .....:	SHV06008/19-01
Certificate no.....:	44780 19 406749 - 173 replaced certificate no 44780 19 406749 - 170
Date of issue ....:	09/19/2019
Report no. .....:	492011236.002
Module type(s) .:	**PV Modules with 6" Mono-crystalline Silicon Solar Cells:** 72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) **PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: HCM72-xxxW (xxx = 350 - 390, in increment of 5) 120 cells: HCM60-xxxW (xxx = 290 - 325, in increment of 5)

	144 cells: HCM72X9-xxxW (xxx = 385 - 410, in increment of 5) 120 cells: HCM60X9-xxxW (xxx = 320 - 340, in increment of 5)
Description: ..... :	Based on certificate No. 44780 19 406749 - 170 extend to a mono cell.
Supplementary information: N/A	
File no. ..... :	SHV06008/19-02
Certificate no.... :	44780 19 406749 - 367 replaced certificate no 44780 19 406749 - 173 44780 19 406749 - 368 replaced certificate no 44780 19 406749 - 171
Date of issue .... :	06/18/2019
Report no. ..... :	492011236.003
Module type(s) . :	**PV Modules with 6" Mono-crystalline Silicon Solar Cells:** 72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) 72 cells: DHM72X-xxxW (xxx= 370 - 390, in increment of 5) 60 cells: DHM60X-xxxW (xxx= 310 - 325, in increment of 5) **PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: HCM72-xxxW (xxx = 350 - 390, in increment of 5) 120 cells: HCM60-xxxW (xxx = 290 - 325, in increment of 5) 144 cells: HCM72X9-xxxW (xxx = 385 - 410, in increment of 5) 120 cells: HCM60X9-xxxW (xxx = 320 - 340, in increment of 5) **PV Modules with 6" Poly-crystalline Silicon Solar Cells:** 72 cells: DHP72-xxxW (xxx= 310 - 335, in increment of 5) 60 cells: DHP60-xxxW (xxx= 260 - 280, in increment of 5) **PV Modules with 6" Half-cut Poly-crystalline Silicon Solar Cells:** 144 cells: HCP72X9-xxxW (xxx = 340 - 375, in increment of 5) 120 cells: HCP60X9-xxxW (xxx = 285 - 300, in increment of 5)
Description: ..... :	Based on certificate No. 44780 19 406749 - 171 & 44780 19 406749 - 173, and test report 492011236.002, extend to several new raw materials with 2 new module types
Supplementary information: N/A	
File no. ..... :	SHV02020/20-01
Certificate no.... :	44780 19 406749 - 367R1M1 replaced certificate no 44780 19 406749 - 367 44780 19 406749 - 368R1M1 replaced certificate no 44780 19 406749 - 368
Date of issue .... :	06/02/2020
Report no. ..... :	492011236.004
Module type(s) . :	**PV Modules with 6" Mono-crystalline Silicon Solar Cells:** 72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) 72 cells: DHM72X-xxxW (xxx= 370 - 390, in increment of 5) 60 cells: DHM60X-xxxW (xxx= 310 - 325, in increment of 5) **PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:**

	144 cells: HCM72-xxxW (xxx = 350 - 390, in increment of 5) 120 cells: HCM60-xxxW (xxx = 290 - 325, in increment of 5) 156 cells: HCM78X9-xxxW (xxx = 415 - 455, in increment of 5) 144 cells: HCM72X9-xxxW (xxx = 385 - 420, in increment of 5) 120 cells: HCM60X9-xxxW (xxx = 320 - 350, in increment of 5) **PV Modules with 6" Poly-crystalline Silicon Solar Cells:** 72 cells: DHP72-xxxW (xxx= 310 - 335, in increment of 5) 60 cells: DHP60-xxxW (xxx= 260 - 280, in increment of 5) **PV Modules with 6" Half-cut Poly-crystalline Silicon Solar Cells:** 156 cells: HCP78X9-xxxW (xxx = 370 - 415, in increment of 5) 144 cells: HCP72X9-xxxW (xxx = 340 - 380, in increment of 5) 120 cells: HCP60X9-xxxW (xxx = 285 - 320, in increment of 5)
Description: ..... :	According to the enquiry of the applicant, based on certificate No. 44780 19 406749 - 367 & 44780 19 406749 - 368, and test report 492011236.003, enlarge the module size with new module type and increase the power range.
Supplementary information: N/A	
File no. ..... :	PVP08053/20P
Certificate no.... :	44780 19 406749 - 367R2M2 replaced certificate no 44780 19 406749 - 367R1M1
Date of issue .... :	11/17/2020
Report no. ..... :	492011236.005
Module type(s) . :	**PV Modules with 6" Mono-crystalline Silicon Solar Cells:** 72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) 72 cells: DHM72X-xxxW (xxx= 370 - 390, in increment of 5) 60 cells: DHM60X-xxxW (xxx= 310 - 325, in increment of 5) **PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: HCM72-xxxW (xxx = 350 - 390, in increment of 5) 120 cells: HCM60-xxxW (xxx = 290 - 325, in increment of 5) 156 cells: HCM78X9-xxxW (xxx = 415 - 455, in increment of 5) 144 cells: HCM72X9-xxxW (xxx = 385 - 420, in increment of 5) 120 cells: HCM60X9-xxxW (xxx = 320 - 350, in increment of 5) 144 cells: DHM-72L9-xxxW (xxx = 430 - 465, in increment of 5) 120 cells: DHM-60L9-xxxW (xxx = 360 - 385, in increment of 5) **PV Modules with 6" Poly-crystalline Silicon Solar Cells:** 72 cells: DHP72-xxxW (xxx= 310 - 335, in increment of 5) 60 cells: DHP60-xxxW (xxx= 260 - 280, in increment of 5) **PV Modules with 6" Half-cut Poly-crystalline Silicon Solar Cells:** 156 cells: HCP78X9-xxxW (xxx = 370 - 415, in increment of 5) 144 cells: HCP72X9-xxxW (xxx = 340 - 380, in increment of 5) 120 cells: HCP60X9-xxxW (xxx = 285 - 320, in increment of 5)
Description: ..... :	Based on certificate No. 44780 19 406749 - 367R1M1, and test report 492011236.004 extend to new raw materials and related new model types
Supplementary information: N/A	

File no. .....:	PVP11051/20P
Certificate no.....:	44780 19 406749 - 367R2M3 replaced certificate no 44780 19 406749 - 367R2M2 44780 19 406749 - 368R1M2 replaced certificate no 44780 19 406749 - 368R1M1
Date of issue ....:	12/09/2020
Report no. .....:	492011236.006
Module type(s) .:	**PV Modules with 6" Mono-crystalline Silicon Solar Cells:** 72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) 72 cells: DHM72X-xxxW (xxx= 370 - 390, in increment of 5) 60 cells: DHM60X-xxxW (xxx= 310 - 325, in increment of 5) **PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: HCM72-xxxW (xxx = 350 - 390, in increment of 5) 120 cells: HCM60-xxxW (xxx = 290 - 325, in increment of 5) 156 cells: HCM78X9-xxxW (xxx = 415 - 455, in increment of 5) 144 cells: HCM72X9-xxxW (xxx = 385 - 420, in increment of 5) 120 cells: HCM60X9-xxxW (xxx = 320 - 350, in increment of 5) 144 cells: DHM-72L9-xxxW (xxx = 430 - 465, in increment of 5) 120 cells: DHM-60L9-xxxW (xxx = 360 - 385, in increment of 5) **PV Modules with 6" Poly-crystalline Silicon Solar Cells:** 72 cells: DHP72-xxxW (xxx= 310 - 335, in increment of 5) 60 cells: DHP60-xxxW (xxx= 260 - 280, in increment of 5) **PV Modules with 6" Half-cut Poly-crystalline Silicon Solar Cells:** 156 cells: HCP78X9-xxxW (xxx = 370 - 415, in increment of 5) 144 cells: HCP72X9-xxxW (xxx = 340 - 380, in increment of 5) 120 cells: HCP60X9-xxxW (xxx = 285 - 320, in increment of 5)
Description: .....:	Based on certificate No. 44780 19 406749 - 367R2M2 & 44780 19 406749 - 368R1M1, and test report 492011236.005, extend to 35mm/40mm thickness frame.
Supplementary information: N/A	
File no. .....:	PVP11092/20P
Certificate no.....:	44780 19 406749 - 367R3M4 replaced certificate no 44780 19 406749 - 367R2M3
Date of issue ....:	03/01/2021
Report no. .....:	492011236.007
Module type(s) .:	**PV Modules with 6" Mono-crystalline Silicon Solar Cells:** 72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) 72 cells: DHM72X-xxxW (xxx= 370 - 390, in increment of 5) 60 cells: DHM60X-xxxW (xxx= 310 - 325, in increment of 5) **PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: HCM72-xxxW (xxx = 350 - 390, in increment of 5) 120 cells: HCM60-xxxW (xxx = 290 - 325, in increment of 5)

	156 cells: HCM78X9-xxxW (xxx = 415 - 455, in increment of 5) 144 cells: HCM72X9-xxxW (xxx = 385 - 420, in increment of 5) 120 cells: HCM60X9-xxxW (xxx = 320 - 350, in increment of 5) 144 cells: DHM-72L9-xxxW (xxx = 430 - 465, in increment of 5) 120 cells: DHM-60L9-xxxW (xxx = 360 - 385, in increment of 5) **PV Modules with 7" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: DHM-72X10-xxxW (xxx = 525 - 555, in increment of 5) 132 cells: DHM-66X10-xxxW (xxx = 485 - 505, in increment of 5) 120 cells: DHM-60X10-xxxW (xxx = 440 - 460, in increment of 5) **PV Modules with 6" Poly-crystalline Silicon Solar Cells:** 72 cells: DHP72-xxxW (xxx= 310 - 335, in increment of 5) 60 cells: DHP60-xxxW (xxx= 260 - 280, in increment of 5) **PV Modules with 6" Half-cut Poly-crystalline Silicon Solar Cells:** 156 cells: HCP78X9-xxxW (xxx = 370 - 415, in increment of 5) 144 cells: HCP72X9-xxxW (xxx = 340 - 380, in increment of 5) 120 cells: HCP60X9-xxxW (xxx = 285 - 320, in increment of 5)
Description: ..... :	Based on certificate No. 44780 19 406749 - 367R2M3, and test report 492011236.006 extend to new solar cell 182M-ten (half-cut) manufactured by Tongwei solar (Chendu) Co., Ltd and new junction box F20-01 002 manufactured by Changshu Friends Connector Technology Co., Ltd.
Supplementary information: N/A	

Summary of testing

According to the enquiry of the applicant, based on certificate No. 44780 19 406749 - 367R3M4, and report no. 492011236.007 extend to new raw materials and new model types according to IEC / EN 61215-1:2016; IEC / EN 61215-1-1:2016; IEC 61215-2:2016 / EN 61215-2:2017 + AC:2017 + AC:2018; IEC 61730-1:2016 / EN IEC 61730-1:2018 + AC:2018; IEC 61730-2:2016 / EN IEC 61730-2:2018 + AC:2018.

New raw materials:

- Extend to new frame parts
  6005-T6, Thickness = 30/32mm, Installation method: mounting holes
  Manufacturer: Anhui Xinbo Aluminium Industry Share Co., Ltd.

New module types:

PV Modules with 6" Mono-crystalline Silicon Solar Cells:

72 cells: DHM72/FS-xxxW (xxx = 325 - 370, in increment of 5)

60 cells: DHM60/FS-xxxW (xxx = 275 - 310, in increment of 5)

72 cells: DHM72X/FS-xxxW (xxx= 370 - 390, in increment of 5)

60 cells: DHM60X/FS-xxxW (xxx= 310 - 325, in increment of 5)

PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:

144 cells: HCM72/FS-xxxW (xxx = 350 - 390, in increment of 5)

120 cells: HCM60/FS-xxxW (xxx = 290 - 325, in increment of 5)

156 cells: HCM78X9/FS-xxxW (xxx = 415 - 455, in increment of 5)

144 cells: HCM72X9/FS-xxxW (xxx = 385 - 420, in increment of 5)

120 cells: HCM60X9/FS-xxxW (xxx = 320 - 350, in increment of 5)

144 cells: DHM-72L9/FS-xxxW (xxx = 430 - 465, in increment of 5)

144 cells: DHM-72L9/BF-xxxW (xxx = 430 - 465, in increment of 5)

144 cells: DHM-72L9/FS/BF-xxxW (xxx = 430 - 465, in increment of 5)

120 cells: DHM-60L9/FS-xxxW (xxx = 360 - 385, in increment of 5)

120 cells: DHM-60L9/BF-xxxW (xxx = 360 - 385, in increment of 5)

120 cells: DHM-60L9/FS/BF-xxxW (xxx = 360 - 385, in increment of 5)

PV Modules with 7" Half-cut Mono-crystalline Silicon Solar Cells:

144 cells: DHM-72X10/FS-xxxW (xxx = 525 - 555, in increment of 5)

144 cells: DHM-72X10/BF-xxxW (xxx = 525 - 555, in increment of 5)

144 cells: DHM-72X10/FS/BF-xxxW (xxx = 525 - 555, in increment of 5)

132 cells: DHM-66X10/FS-xxxW (xxx = 485 - 505, in increment of 5)

132 cells: DHM-66X10/BF-xxxW (xxx = 485 - 505, in increment of 5)

132 cells: DHM-66X10/FS/BF-xxxW (xxx = 485 - 505, in increment of 5)

120 cells: DHM-60X10/FS-xxxW (xxx = 440 - 460, in increment of 5)

120 cells: DHM-60X10/BF-xxxW (xxx = 440 - 460, in increment of 5)

120 cells: DHM-60X10/FS/BF-xxxW (xxx = 440 - 460, in increment of 5)

108 cells: DHM-54X10-xxxW (xxx = 395 - 415, in increment of 5)

108 cells: DHM-54X10/FS-xxxW (xxx = 395 - 415, in increment of 5)

108 cells: DHM-54X10/BF-xxxW (xxx = 395 - 415, in increment of 5)

108 cells: DHM-54X10/FS/BF-xxxW (xxx = 395 - 415, in increment of 5)

DHM-72X10FS-535W was selected as representative test samples and conducted with all the related tests. All tests were successfully completed. And factory inspection was performed. Therefore, from the result of testing and factory inspection, it is recommended that certification should be granted.
Detailed product information are to be found in the CDF (constructional data form) in Annex 1 of this report.

General remarks

Test item particulars:	
Accessories and detachable parts included in the evaluation .....:	N/A
Options included.....:	N/A
Abbreviations used in the report:	
HF - Humidity Freeze	TC - Temperature Cycling
DH - Damp Heat	Vmpp - Maximum power voltage
Impp - Maximum power current	Voc - Open circuit voltage
Isc - Short circuit current	FF - Fill Factor
Pmpp - Maximum power	α - Current temperature coefficient
NMOT - Nominal Module Operating Temperature	β - Voltage temperature coefficient
STC - Standard Test Conditions	γ - Power temperature coefficient
CTI - Comparative Tracking Index	PTI - Proof Tracking Index
RTI - Relative Temperature Index	RTE - Relative Thermal Endurance index
TI - Temperature Index	DTI - Distance through insulation
Cl - Clearances	Cr - Creepage distances
PD - Pollution Degree	MG - Material Groups
Possible test case verdicts:	
Test case does not apply to the test object.....:	Not Applicable (N/A)
Test object does meet the requirement.....:	Pass (P)
Test object does not meet the requirement.....:	Fail (F)
Other remarks:	
The test verdicts presented in this report relate only to the object tested. This report shall not be reproduced except in full, without the written approval of the issuing testing laboratory. “(see Annex #)” refers to additional information appended to the report. “(see Table #)” refers to a table appended to the report. Power degradation data expressed in negative value indicates a reduction of maximum power output. Power degradation data expressed in positive value indicates an increment of maximum power output. Throughout this report, a point is used as the decimal separator.	

General product information

Module type: DHM-72X10FS-535W

Product Electrical Ratings at STC:	
Nominal maximum power (Pmax) [W] with tolerance .....:	535±3%
Nominal open circuit voltage at (Voc) [V] with tolerance...:	49.6±3%
Nominal maximum power voltage (Vmpp) [V].....:	41.8
Nominal short circuit current at (Isc) [A] with tolerance.....:	13.60±3%
Nominal maximum power current (Impp) [A].....:	12.80
Product Safety Ratings:	
Maximum system voltage [V].....:	1500
Fuse rating [A] .....:	25
Safety class in accordance with IEC 61140 .....:	Class II
Fire safety class.....:	Class C
Recommended maximum series module configurations ..:	Written in installation manual
Recommended maximum parallel module configurations :	Written in installation manual

Testing procedure

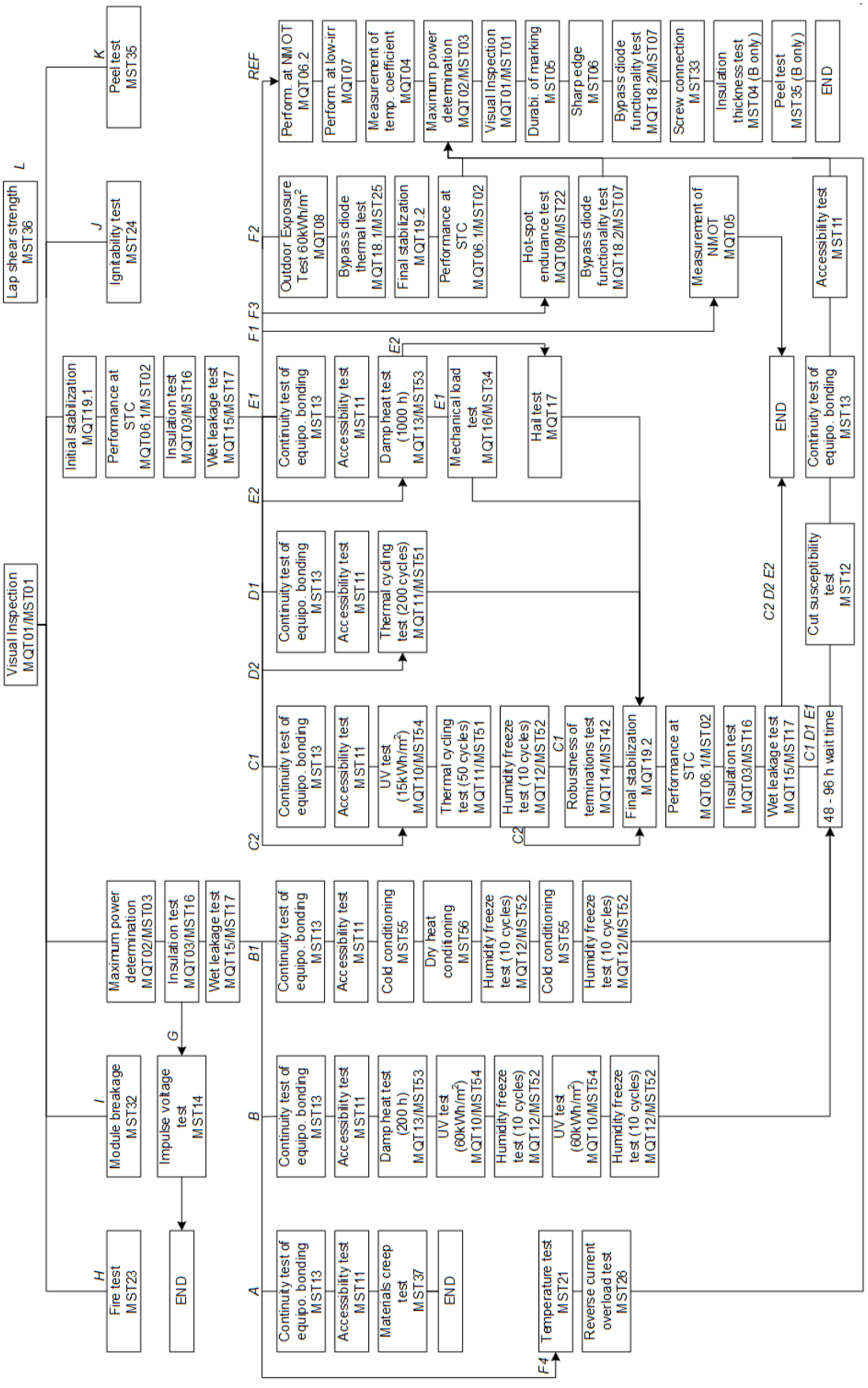
Module type: DHM-72X10FS-535W

☐	Random sampling from production
☒	Prototype submitted by client
☐	New module type
☒	Modifications (if yes, please choose the applicable modification according to the Retesting Guideline)
☐	Modification to frontsheet
☐	Modification to encapsulation system
☐	Modification to cell technology
☐	Modification to cell and string interconnect material or technique
☐	Modification to backsheet
☐	Modification to electrical termination
☐	Modification to bypass diode
☐	Modification to electrical circuitry
☐	Modification to edge sealing
☒	Modification to frame and/or mounting structure
☐	Change in PV module size
☐	Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process
☐	Increase of over-current protection rating
☐	Increase of system voltage
☐	Change in cell fixing tape
☐	Others
☐	Others

Description of similarity (differences) between the applied model and the previously tested model:

- Extend to new frame parts
  6005-T6, Thickness = 30/32mm, Installation method: mounting holes
  Manufacturer: Anhui Xinbo Aluminium Industry Share Co., Ltd.

Test sequence



Module group assignment

Module type: DHM-72X10FS-535W

Sample #	Serial number	Dimension (l x w x h) [mm]	Remark
1	185821051004039365	2256 x 1133 x 30	REF
2	185821061004089276	2256 x 1133 x 30	E1
3	185821061004089150	2256 x 1133 x 30	I

Clause	Requirement + Test	Result - Remark	Verdict

Test result overview

5 Marking and documentation			**-**
5.1 Name Plate			**-**
The module include the following clear and indelible markings:			-
a)	Name, registered trade name or registered trade mark of manufacturer	Yes	P
b)	Type or model number designation	Yes	P
c)	Serial number (unless marked on other part of product)	Laminated inside	N/A
d)	Date and place of manufacture; alternatively serial number allowing to trace the date and place of manufacture	Traceable by SN	P
e)	Maximum system voltage	Yes	P
f)	Class of protection against electrical shock	Yes	P
g)	Voltage at open-circuit or Voc including tolerances.	Yes	P
h)	Current at short-circuit or Isc including tolerances	Yes	P
i)	Module maximum power or Pmax including tolerances	Yes	P
-	All electrical data is shown as relative to standard test conditions (1000W/m^2, 25°C, AM1.5 according to IEC TS 61836).	Yes	P
-	International symbols are used where applicable.	Yes	P
5.2 Documentation			-
5.2.1 Minimum requirements			-
-	Modules are supplied with documentation describing the methods of electrical and mechanical installation as well as the electrical ratings of the module	Yes	P
-	The documentation states the class of protection against electrical shock under which the module has been qualified and any specific limitations required for that class.	Yes	P
-	The documentation assures that installers and operators receive appropriate and sufficient documentation for safe installation, use, and maintenance of the PV modules.	Yes	P
5.2.2 Information to be given in the documentation			-
a)	All information required under 5.1 e) to i)	Yes	P
b)	Reversed current rating in accordance to IEC / EN 61730-2		-
-	Overcurrent protection device type and rating are e.g. given in IEC 60269-6.	Yes	P

Clause	Requirement + Test	Result - Remark	Verdict
-	Maximum series / parallel module configurations is recommended	Yes	P
c)	Manufacturer's stated tolerance for Voc, Isc and maximum power output under standard test conditions	Yes	P
d)	Temperature coefficient for voltage at open-circuit	Yes	P
e)	Temperature coefficient for maximum power	Yes	P
f)	Temperature coefficient for short-circuit current	Yes	P
-	All electrical data mentioned above is shown as relative to standard test conditions (1000W/m^2, 25°C, AM1.5 according to IEC TS 61836).	Yes	P
g)	Nominal module operating temperature (NMOT) is specified	Yes	P
h)	Performance at NMOT (MQT 06.2) is specified	Yes	P
i)	Performance at low irradiance (MQT 07) is specified	Yes	P
-	International symbols are used where applicable	Yes	P
-	Compliance is checked by inspection and MQT 04 through MQT 07.	Yes	P
The electrical documentation include a detailed description of the electrical installation wiring method to be used, including:			-
j)	The minimum cable diameters for modules intended for field wiring	Yes	P
k)	Any limitations on wiring methods and wire management that apply to the wiring compartment or box;	Yes	P
l)	The size, type, material and temperature rating of the conductors to be used	Yes	P
m)	Type of terminals for field wiring	Yes	P
n)	Specific PV connector model/types and manufacturer to which the module connectors are mated	Yes	P
o)	The bonding method(s) to be used (if applicable); all provided or specified hardware is identified in the documentation	Yes	P
p)	The type and ratings of bypass diode to be used (if applicable)	Yes	P
q)	limitations to the mounting situation (e.g., slope, orientation, mounting means, cooling)	Yes	P
r)	A statement indicating the fire rating(s) and the applied standard as well as the limitations to that rating (e.g., installation slope, sub structure or other applicable installation information)	Yes	P

Clause	Requirement + Test	Result - Remark	Verdict
s)	A statement indicating the design load per each mechanical means for securing the module as evaluated during the static mechanical load test according to MQT 16. At discretion of the manufacturer the test load and/or the safety factor γm may be noted, too	Yes	P
-	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."*	Yes	P
5.2.3 Assembly instructions			-
-	These 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	Yes	P
Supplementary information: N/A			

Clause	Requirement + Test	Result - Remark	Verdict
7 Pass criteria			-
7.1 General			-
-	If two or more modules fail to meet the following test criteria, the design is deemed not to have met the qualification requirements	No	P
-	Should one module fail any test, two additional modules meeting the requirements of Clause 4 is subjected to the entire series of tests of the respective test sequence. If one or both of these modules also fail, the design is deemed not to have met the qualification requirements. If, however, both modules pass the test sequence, the design is judged to have met the qualification requirements.	No	P
-	A module design is judged to have passed the qualification tests and therefore to be approved according to this standard, if each test sample meets all of the following criteria.	Yes	P
7.2 Power output and electric circuitry			-
7.2.1 Verification of rated label values (Gate No. 1)			-
-	After stabilization, each individual module meets: $P_{max}(Lab) \cdot \left(1 + \frac{\lvert m_1 \rvert [\%]}{100}\right) \geq P_{max}(NP) \cdot \left(1 - \frac{\lvert t_1 \rvert [\%]}{100}\right)$	Yes	P
-	After stabilization: $\bar{P}_{max}(Lab) \cdot \left(1 + \frac{\lvert m_1 \rvert [\%]}{100}\right) \geq P_{max}(\mathrm{NP})$	Yes	P
-	After stabilization, each individual module meets: $V_{OC}(Lab) \cdot \left(1 + \frac{\lvert m_2 \rvert [\%]}{100}\right) \leq V_{oc}\,(NP) \cdot \left(1 + \frac{\lvert t_2 \rvert [\%]}{100}\right)$	Yes	P
-	After stabilization, each individual module meets: $I_{SC}(Lab) \cdot \left(1 + \frac{\lvert m_3 \rvert [\%]}{100}\right) \leq I_{SC}\,(NP) \cdot \left(1 + \frac{\lvert t_3 \rvert [\%]}{100}\right)$	Yes	P
7.2.2 Maximum power degradation during type approval testing (Gate No. 2)			-
-	At the end of each test sequence or for sequence B after bypass diode test, each test sample meets: $P_{max}(\mathrm{Lab\_Gate\#2}) \geq 0.95 \times P_{max}(\mathrm{Lab\_Gate\#1}) \cdot \left(1 - \frac{r[\%]}{100}\right)$	Yes	P
7.2.3 Electrical circuitry			-
-	Samples are not permitted to exhibit an open-circuit during the tests	No open-circuit observed.	P

Clause	Requirement + Test	Result - Remark	Verdict
7.3 Visual defects			**-**
-	There is no visual evidence of a major defect.	Yes	P
7.4 Electrical safety			**-**
-	The insulation test (MQT 03) requirements are met after the tests	Yes	P
-	The wet leakage current test (MQT 15) requirements are met at the beginning and the end of each sequence.	Yes	P
-	Specific requirements (IEC 61215-1-1) of the individual tests are met.	Yes	P
Supplementary information: N/A			

Clause	Requirement + Test	Result - Remark	Verdict

Module type: DHM-72X10FS-535W

Initial examinations			-
MQT19.1	Initial stabilization ..... :	Performed by testing lab, see table 4.19.5	-
MQT01/MST01	Visual inspection ..... :	See table 4.1 & 10.2	P
MQT06.1/MST02	Performance at STC (Gate #1) ..... :	See table 4.6.1	P
MQT03/MST16	Insulation test ..... :	See table 4.3 & 10.13	P
MQT15/MST17	Wet leakage current test ..... :	See table 4.15 & 10.14	P
MQT02/MST03	Maximum power determination ..... :	See table 10.4	P
MST13	Continuity test for equipotential bonding ..... :	See table 10.11	P
MST11	Accessibility test ..... :	See table 10.9	P

Sample 2#			**-**
MQT13/MST53	Damp heat test (1000h) ..... :	N/A	N/A
MQT16/MST34	Static mechanical load test ..... :	See table 4.16	P
MQT19.3	Stress-Specific Stabilization - BO LID ..... :	N/A	N/A
MST12	Cut susceptibility test ..... :	N/A	N/A

Sample 3#			**-**
MST32	Module breakage test ..... :	See table 10.21	P

Final examinations			-
MQT06.1/MST02	Performance at STC (Gate #2) ..... :	See table 4.6.1	P
MQT03/MST16	Insulation test ..... :	See table 4.3	P
MQT15/MST17	Wet leakage current test ..... :	See table 4.15	P
MST13	Continuity test for equipotential bonding ..... :	See table 10.11	P
MST11	Accessibility test ..... :	See table 10.9	P
-	48-96h wait time	-	-
MQT02/MST03	Maximum power determination ..... :	See table 10.4	P
MQT01/MST01	Visual inspection ..... :	See table 10.2	P
MST05	Durability of markings ..... :	See table 10.6	P
MST06	Sharp edge test ..... :	See table 10.7	P
MQT18.2/MST07	Bypass diode functionality test ..... :	See table 10.19	P
MST33	Screw connections test ..... :	N/A	N/A
MST04	Insulation thickness test ..... :	N/A	N/A
MST35	Peel test ..... :	N/A	N/A

IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

Test results of IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2

Module type: DHM-72X10FS-535W

4.1 Visual inspection (initial) - MQT01/MST01		-
Test date [MM/DD/YYYY].....:	07/12/2021	-
Sample #	Nature and position of initial findings - comments or attach photos	-
1	No visual defects	P
2	No visual defects	P
Supplementary information: N/A		

IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.19.5 Stabilization (initial) - MQT19.1							-
Sample #.....:			1				-
Light exposure method.....:			☐ Solar simulator / ☒ Natural sunlight / ☐ Others				-
Test date [MM/DD/YYYY] / start - end .:			06/30/2021 - 07/12/2021				-
Test cycle	Integrated irradiation [kWh/m²]	Irradiance [W/m²]	Module temperature [°C]	Resistive load [Ω]	Pmpp at the end of cycle [W]	(P_{max} - P_{min}) / $P_{average}$ [%]	Stable? [Y / N]
Initial(P1)	N/A	N/A	N/A	N/A	538.4	-	-
1(P2)	5.0	>500	N/A	N/A	540.2	-	-
2(P3)	5.0	>500	N/A	N/A	538.2	0.38	Yes
Sample #.....:			2				-
Light exposure method.....:			☐ Solar simulator / ☒ Natural sunlight / ☐ Others				-
Test date [MM/DD/YYYY] / start - end .:			06/30/2021 - 07/12/2021				-
Test cycle	Integrated irradiation [kWh/m²]	Irradiance [W/m²]	Module temperature [°C]	Resistive load [Ω]	Pmpp at the end of cycle [W]	(P_{max} - P_{min}) / $P_{average}$ [%]	Stable? [Y / N]
Initial(P1)	N/A	N/A	N/A	N/A	534.2	-	-
1(P2)	5.0	>500	N/A	N/A	537.1	-	-
2(P3)	5.0	>500	N/A	N/A	533.6	0.64	Yes
Supplementary information: N/A							

IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.6.1 Performance at STC (after initial stabilization, Gate #1) - MQT06.1/MST02							-
Test date [MM/DD/YYYY]:			07/12/2021				-
Test method:			☒ Simulator / ☐ Natural sunlight				-
Irradiance [W/m²]:			1000				-
Module temperature [°C]:			25.0				-
$P_{max}(lab)$ lower limit [W]:			506.3				-
$\overline{P}_{max}(lab)$ lower limit [W]:			522.0				-
$V_{OC}(lab)$ upper limit [V]:			50.68				-
$I_{SC}(lab)$ upper limit [A]:			13.69				-
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	-
1	49.60	41.66	13.58	12.92	538.2	79.92	P
2	49.21	41.16	13.60	12.96	533.6	79.74	P
Average	-	-	-	-	535.9	-	P
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.3 Insulation test (initial) - MQT03/MST16				-
Test date [MM/DD/YYYY].....:		07/12/2021		-
Test voltage applied [V].....:		2 minutes of 1500 and 1 minute of 8000		-
Sample #	Required [MΩ]	Measured [MΩ]	Dielectric breakdown?	-
1	15.5	>1000	No	P
2	15.5	>1000	No	P
Supplementary information: Minimum requirement according to the standard is 40MΩ·m^2. Area of the module is 2.58m^2.				

IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.15 Wet leakage current test (initial) - MQT15/MST17			-
Test date [MM/DD/YYYY].....:		07/12/2021	-
Test voltage applied [V].....:		2 minutes of 1500	-
Solution resistivity [Ω/cm] / <3500 .....:		1872	-
Solution temperature [°C] / 22±2 .....:		23.6	-
Sample #	Required [MΩ]	Measured [MΩ]	-
1	15.5	>1000	P
2	15.5	>1000	P
Supplementary information: Minimum requirement according to the standard is 40MΩ·m^2. Area of the module is 2.58m^2.			

IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.16 Static mechanical load test - MQT16/MST34							-
Sample #.....:		2					-
Test date [MM/DD/YYYY].....:		07/20/2021					-
Designed load (downward / upward) [Pa] .....:		3600 / 1600					-
Safety factor.....:		1.5					-
Mounting method .....:		Mounting holes (8 points)					-
Load applied to.....:		Downward		Upward			-
Mechanical load [Pa].....:		5400		2400			-
1st cycle duration [hours].....:		1h		1h			-
Intermittent open-circuit? .....:		No		No			-
2nd cycle duration [hours].....:		1h		1h			-
Intermittent open-circuit? .....:		No		No			-
3rd cycle duration [hours] .....:		1h		1h			-
Intermittent open-circuit? .....:		No		No			-
Supplementary information: N/A							
4.1 Visual inspection (after static mechanical load test) - MQT01/MST01							-
Test date [MM/DD/YYYY].....:		07/21/2021					-
Sample #	Nature and position of initial findings - comments or attach photos						-
2	No visual defects						P
Supplementary information: N/A							
4.2 Maximum power determination (after statistic mechanical load test) - MQT02/MST03							-
Test date [MM/DD/YYYY].....:		07/21/2021					-
Ambient temperature [°C].....:		Corrected to 25.0					-
Irradiance [W/m²].....:		Corrected to 1000					-
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	-
2	49.12	41.09	13.61	12.99	533.9	79.85	-
Supplementary information: N/A							
4.3 Insulation test (after static mechanical load test) - MQT03/MST16							-
Test date [MM/DD/YYYY].....:		07/21/2021					-
Test voltage applied [V].....:		2 minutes of 1500 and 1 minute of 8000					-
Sample #	Required [MΩ]		Measured [MΩ]		Dielectric breakdown?		-
2	15.5		>1000		No		P
Supplementary information: Minimum requirement according to the standard is 40MΩ·m². Area of the module is 2.58m².							

IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.15 Wet leakage current test (after static mechanical load test) - MQT15/MST17			-
Test date [MM/DD/YYYY].....:		07/21/2021	-
Test voltage applied [V].....:		2 minutes of 1500	-
Solution resistivity [Ω/cm] / <3500 .....:		1885	-
Solution temperature [°C] / 22±2 .....:		23.5	-
Sample #	Required [MΩ]	Measured [MΩ]	-
2	15.5	>1000	P
Supplementary information: Minimum requirement according to the standard is 40MΩ·m^2. Area of the module is 2.58m^2.			

IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.6 Performance at STC (final, Gate #2) - MQT06.1/MST02							-
Test method .....:			☒ Simulator / ☐ Natural sunlight				-
Irradiance [W/m²].....:			1000				-
Module temperature [°C] .....:			25.0				-
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	-
2	49.10	41.07	13.62	12.99	533.6	79.82	-
Power degradation of each module after each test sequences							-
Sample #	Pmp (initial) [W]	Pmp (final) [W]	Reproducibility *r* [%]	Power degradation [%]	Maximum allowed degradation [%]		-
2	533.6	533.6	0.17	<0.01	-5.16		P
Supplementary information: According to Gate #2, Maximum allowed degradation [%] = -(5 + 0.95 x *r*)							

IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.3 Insulation test (final) - MQT03/MST16				-
Test voltage applied [V].....:		2 minutes of 1500 and 1 minute of 8000		-
Sample #	Required [MΩ]	Measured [MΩ]	Dielectric breakdown?	-
2	15.5	>1000	No	P
Supplementary information: Minimum requirement according to the standard is 40MΩ·m^2. Area of the module is 2.58m^2.				

IEC / EN 61215-1, IEC / EN 61215-1-1 & IEC / EN 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.15 Wet leakage current test (final) - MQT15/MST17			-
Test voltage applied [V] .....:		2 minutes of 1500	-
Solution resistivity [Ω/cm] / <3500 .....:		<3500	-
Solution temperature [°C] / 22±2 .....:		22±2	-
Sample #	Required [MΩ]	Measured [MΩ]	-
2	15.5	>1000	P
Supplementary information: Minimum requirement according to the standard is 40MΩ·m^2. Area of the module is 2.58m^2.			

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

Test results of IEC / EN 61730-1

4 Classification, application and intended use			**-**
4.1 General			-
-	The module has been evaluated for the following Class (IEC 61140) ..... :	II	-
4.5 Intended use			-
PV modules are installed in the following special applications:			-
a)	Building attached PV (BAPV)	N/A	-
b)	Building integrated PV (BIPV)	N/A	-
c)	Applications in areas where snow and / or wind load exceeding loads as tested in IEC 61730-2 are expected	N/A	-
d)	Applications at environmental temperature exceeding the limits indicated in 5.1 of IEC 61730-1	N/A	-
e) - j)	Other (e to j as listed in 4.5 of IEC 61730-1, please specify)	N/A	-
Supplementary information: N/A			-

Remark:

Classification as in IEC 61730-1:

Class 0: Modules rated for use in this classification have individual and/or system level electrical outputs at hazardous levels of voltage, current and power. Class 0 PV modules are intended for use in restricted access areas that are protected from public access by fences or other measures of the location that prevent general access.

Class II: Modules rated for use in this classification II have individual and/or system level electrical outputs at hazardous levels of voltage, current and power. These PV modules are intended for installation where general user access and contact to insulated live parts is anticipated.

Class III: Modules rated for use in this classification shall not have electrical ratings greater than 240W where the open-circuit voltage does not exceed 35VDC and the short-circuit current does not exceed 8 A when tested under standard test conditions. These PV modules are intended for installation where general user access and contact to uninsulated live parts is anticipated.

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5 Requirements for design and construction			**-**
5.1 General			**-**
-	All PV modules shall be 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°C to +40°C and up to 100 % relative humidity as well as rain.	IEC 61215 and IEC 61730-2, all tests were passed.	P
-	A PV module can either be completely assembled when shipped from the factory, or be provided in subassemblies. The provided assemblies of the product shall not involve any action that is likely to affect compliance with the requirements of the IEC 61730 series. Incorporation of a PV module into the final assembly shall not require any alteration of the PV module from its originally evaluated form.	No assembly part is present.	N/A
-	The construction of a PV module shall be such that equipotential bonding continuity, if applicable, is not interrupted by installation	IEC 61730-2, MST 13 was passed	P
-	Any adjustable or movable structural part shall be provided with a locking device to reduce the likelihood of unintentional movement, if any such movement may result in a risk of fire, electric shock, or injury to persons.	No such part	N/A
-	PV modules shall not have accessible burrs, sharp edges or sharp points that can cause injury to users or service persons. Edges and points that appear to be sharp by inspection, shall comply with the sharp edge test (MST 06).	IEC 61730-2, MST06 test was passed.	P
-	Parts shall be prevented from loosening or turning if such loosening or turning may result in a risk of fire, electric shock, or injury to persons. Compliance for components is verified by specific tests described in the relevant standards or screw connection test (MST 33).	No such part	N/A

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.2 Marking and documentation			**-**
5.2.1 General			-
-	Instructions related to safety shall be in an official language of the country where the equipment is to be installed.	Installation manual with English.	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	Stuck beside the string connectors.	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.	P
f)	“Maximum system voltage” or ”V_{sys}”	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 “V_{oc}” including manufacturing tolerances	Written on the nameplate.	P
i)	“Current at short-circuit” or “I_{sc}” including manufacturing tolerances	Written on the nameplate.	P
j)	“PV module maximum power” or “P_{max}” including manufacturing tolerances	Written on the nameplate.	P
k)	“Maximum overcurrent protection rating” (compliance is verified by reverse current overload test (MST 26))	Written on the nameplate.	P
-	All electrical data shall be shown as relative to standard test conditions (STC: 1000W/m^2, 25±2°C, AM 1.5 according to IEC 60904-3).	Written on the nameplate.	P
-	International symbols shall be used where applicable.	Written on the nameplate.	P
-	PV connectors or wiring shall be marked in accordance to IEC 62852 with a symbol „Do not disconnect under load“, as given in Annex A. Symbol or warning notice shall be imprinted or labelled close to connector.	“Do not disconnect under load” is written on the connector.	P
-	PV connectors shall be clearly marked indicating the terminal polarity.	The terminal polarity is marked on the PV connectors.	P

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
-	For Class II and Class 0 PV modules, the folowing (IEC 60417-6042: Caution, risk of electric shock) symbol shall be applied near the PV module electrical connection means. 	Written on the nameplate.	P
-	PV modules shall be marked to indicate the class according to IEC 61730-I: 2016.	Written on the nameplate.	P
-	PV modules provided with a functional earth connection shall be provided with a symbol according to 5.2.2.2.2, Figure 3.	No functional earth connection	N/A
-	PV modules provided with terminals for field wiring rated only for use with copper wire shall be 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 provided with terminals for field wiring rated only for use with a different specific wiring material shall be 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			-
-	A wiring terminal or bonding location of a PV module intended to accommodate a field installed bonding conductor for equipotential bonding is identified with the appropriate symbol IEC 60417-5021 (DB:2002-10) (Figure 2)). Alternatively IEC 60417-5017 (Figure 1) can be used. No other terminal or location shall be identified in this manner.	Printed on the frame	N/A
5.2.2.2.2 Functional earthing			-
-	A wiring terminal or bonding location of a PV module intended to accommodate a field installed functional earthing conductor is identified with the appropriate symbol (IEC 60417-5018 (DB: 2002-10) (Figure 3).	No Functional earthing	N/A
5.2.3 Documentation			-
-	PV modules shall be supplied with documentation describing the methods of electrical and mechanical installation as well as the electrical ratings of the PV module.	Written in installation manual.	P
-	The documentation shall state the Class under which the PV module was qualified and any specific limitations required for that Class.	Written in installation manual.	P
-	The documentation shall state the environmental conditions to which the module has been qualified which by default includes a temperature range of -40°C to +40°C.	Written in installation manual.	P

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
-	The documentation shall state the environmental conditions to which the module has been qualified which by default includes wind / snow load including safety factor.	Written in installation manual.	P
-	It shall be ensured that appropriate documentation for safe installation, use, and maintenance is available to installers and operators.	Written in installation manual.	P
The documentation shall contain the following information:			-
-	All information required by 5.2.2.1 with exception of c), d) and e)	See above	P
-	Recommended maximum series / parallel PV module configurations	Written in installation manual.	P
-	The current rating of overcurrent protection, as determined in MST 26	Written on the nameplate.	P
-	Manufacturer's stated tolerance for V_{oc}, I_{sc} and maximum power output P_{max} under standard test conditions	Written on the nameplate.	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 (1000 W/m^2, (25 $\pm$ 2)°C, AM 1.5 according to IEC 60904-3).	Written on the nameplate.	P
-	International symbols shall be used where applicable.	Written on the nameplate.	P
The electrical documentation shall include a detailed description of the electrical installation wiring method to be used. This description shall include:			-
-	The minimum cable diameters for PV modules intended for field wiring	Written in installation manual.	P
-	Any limitations on wiring methods and wire management that apply to the junction box for the PV module	Written in installation manual.	P
-	The size, type, material, and temperature rating of the conductors to be used	Written in installation manual.	P
-	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) to be used (if applicable) shall be specified. All provided or specified hardware shall be identified in the documentation.	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,	Written in installation manual.	P

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	mounting means, cooling)		
-	A statement indicating the fire rating(s) and the applied standard, or a statement that resistance to external fire sources was not evaluated, as well as the limitations to that rating (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 (as evaluated during the mechanical load test (MST 34))	Written in installation manual.	P
-	A statement indicating the maximum altitude the PV module is designed for. De-ratings can be applied.	Written in installation manual.	P
The documentation for roof mounting shall include:			-
-	A statement indicating the minimum mechanical means for securing the PV module to the roof (as evaluated during the mechanical load test according (MST 34)	Written in installation manual.	P
-	Details of the specific parameter(s) when the fire rating is dependent on a specific mounting structure, specific spacing, or specific means of attachment to the roof or structure.	Written in installation manual.	P
-	The documentation shall include a statement advising that external or otherwise artificially concentrated sunlight shall not be directed onto the front or back face of the PV module (if not qualified for).	Written in installation manual.	P
-	Assembly instructions shall be provided with a product shipped in subassemblies, and shall be detailed and adequate to the degree required to facilitate complete and safe assembly of the product to specifications set forth in the IEC 61730 standard series.	Not applicable	N/A
-	To facilitate proper system sizing the manufacturer shall include relevant parameters in the installation instructions that allow system layout based not only on STC values given in the documentation. For example a safety factor for V_{oc} and I_{sc} of 1.25 is recommended since irradiance is often higher then 1000 W/m^2 and temperature below 25°C may raise V_{oc}. A statement as suggested in IEC 61730:2016 is recommended.	Written in installation manual.	P

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.3 Electrical components and insulation			-
5.3.2 Internal wiring			-
-	Internal wiring shall have sufficient current carrying capacity for the relevant application.	Cable was certified according to EN 50618	P
5.3.4 Connectors			-
-	External DC connectors shall 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 shall fulfil the requirements of IEC 62790.	Junction box was certified according to IEC 62790.	P
5.3.6 Frontsheets and backsheets			-
-	Polymeric frontsheets and backsheets shall meet relevant requirements of section 5.5.2	Relevant test of IEC 61730-2 was passed.	P
-	If these sheets are used as relied upon insulation they shall fulfil requirements of 5.6.4.3 and 5.5.2.3 for insulation in thin layers	Relevant test of IEC 61730-2 was passed.	P
5.3.7 Insulation barriers			-
-	A polymeric insulation barrier shall meet the relevant requirements of 5.5.2	Relevant test of IEC 61730-2 was passed.	P
5.3.8 Electrical connections			-
5.3.8.1 General			-
-	External wires and cables shall fulfil the requirements of EN 50618 or IEC 62930.	Cable was certified according to EN 50618	P
-	External DC connectors shall fulfil the requirements of IEC 62852.	Connectors was certified according to IEC 62852.	P
-	Junction boxes for PV modules shall fulfil the requirements of IEC 62790.	Junction box is certified according to IEC 62790.	P
-	Prevention shall be taken that connections do not become loose, e.g. by using a washer.	No such terminal.	N/A
-	Precautions shall be taken that under operation clamping units or other terminations are prevented from thermal and mechanical stress which might impair electrical conductivity.	No such terminal.	N/A
5.3.8.2 Terminals for external cables and PV connector ribbons			-
-	Terminals for electrical connections shall be suitable for the type and range of conductor cross-sectional areas according to specification of the manufacturer. They shall meet the requirements of IEC 62790.	Junction box is certified according to IEC 62790.	P
-	Insulated terminals shall be designed in a manner where a possible displacement that may result in a reduction of clearances and creepage distances is prevented.	Junction box is certified according to IEC 62790.	P

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.3.8.3 Splices and connections inside a PV module			-
-	Splices and connections inside a PV module other than those for terminals of external cables and PV connector ribbons shall be mechanically secured and shall provide electrical continuity. Electrical connections shall be soldered, welded, conductively adhered, crimped, or otherwise securely connected. A soldered or conductively adhered joint shall be additionally mechanically secured.	No splice. Electrical connections is soldered.	P
5.3.9 Encapsulants			-
a)	The rated operating temperature range of the encapsulant shall include the temperature range of the intended application.	Relevant test of IEC 61730-2 was passed.	P
b)	The material group, the insulation resistance and the dielectric strength of the encapsulant shall be suitable for the intended application.	Relevant test of IEC 61730-2 was passed.	P
5.3.10 Bypass diodes			-
-	Bypass diodes shall be rated to withstand the current and voltage for their intended use.	IEC 61730-2, MST25 test was passed.	P

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4 Mechanical and electromechanical connections			-
5.4.1 General			-
-	Mechanical connections shall be able to durably withstand the thermal, mechanical, and environmental stresses occurring in the application without decreasing the integrity of the connection below safe levels.	Connections are mechanically secure.	P
-	Parts intended to be removed shall only be detachable with the aid of tools.	No such part.	N/A
-	For mechanical connections friction between surfaces, such as simple spring pressure, is not acceptable as the sole means to inhibit the turning or loosening of a part.	No such part.	N/A
5.4.2 Screw connections			-
-	Screws and mechanical connections, the failure of which might cause the PV module to become unsafe, shall withstand the mechanical stresses occurring in normal use. Screws shall not be 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, e.g. fixing screws in frames and other components, shall withstand the mechanical stresses occurring in normal use. At least one screw per electrical- mechanical connection shall ensure 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 shall screw into metal.	No screw is used.	N/A
-	For screws used for mechanical and electrical connections two full threads shall engage into the metal.	No screw is used.	N/A
-	Screwed and other fixed connections between different parts of the PV module shall be made in such a way that they do not come loose through torsion, bending stresses, vibration, etc., as may occur in normal use.	No screw is used.	N/A
5.4.3 Rivets			-
-	Rivets which serve as electrical as well as mechanical connections are locked against loosening. A noncircular shank or an appropriate notch may be sufficient.	No rivets is used.	N/A

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.4 Thread-cutting screws			-
-	Thread-cutting screws and self-tapping screws shall not be used for the interconnection of current-carrying parts made of metal which is soft or liable to creep, such as zinc or aluminium.	No screw is used.	N/A
	Thread-forming screws (sheet metal screws) shall not be used for the connection of cur3rent-carrying part, unless they clamp these parts directly in contact with each other, and are provided with suitable locking means.	No screw is used.	N/A
	Thread-cutting (self-tapping) screws shall not be used for the connection of current-carrying parts unless they generate a full form standard machine screw thread. However, screws of the latter type shall not be used if they are likely to be operated by the user or installer	No screw is used.	N/A
	Threat-cutting and threat-forming screws, used to provide continuity for equipotential bonding, shall be 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 engaged the metal.	No screw is used.	N/A
5.4.5 Form/press / tight fit			-
-	Form/press/tight fits of metallic components not separately equipotential bonded need to be electrically connected.	No such part	N/A
5.4.6 Connections by adhesives			-
-	Adhesion of a polymer relied upon for insulation to another insulating layer shall be appropriate for the application.	No such part	N/A
-	If the connection by adhesive should be considered as cemented joint the requirements according to 5.6.4.2 shall be applied.	No such part	N/A
5.4.7 Other connections			-
-	Other connections such as, for example, welded or soldered, were investigated by visual inspection (MST 01). Other connections which are relied upon for equipotential bonding were checked with test of continuity of equipotential bonding (MST 13). Materials and processes for creating the connections shall be appropriate for the intended use.	No such part	N/A

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.5 Materials			-
5.5.2 Polymeric materials			-
5.5.2.1 General			-
-	Polymeric parts which ensure either the electrical or mechanical safety of the PV module, or both, shall be resistant to electrical and mechanical property degradation and shall apply with the requirement of the materials creep test (MST37) depending on their constructive function in the PV module.	Relevant tests of IEC 61730-2 were passed.	P
5.5.2.3 Polymeric materials used as electrical insulation			-
5.5.2.3.3 Endurance to thermal stress - RTE(RTI) or TI (mechanical / electrical)			-
-	Materials used as relied upon insulation shall have a minimum relative thermal endurance, relative thermal index or temperature index (RTE/RTI or TI) in accordance with IEC 60216-5 or IEC 60216-1 equal to or greater than the maximum normalized operating temperature of the material as measured in the particular mounting situation (e.g. roof mounted) during the temperature test (MST 21), or 90 °C, whichever is higher.	RTE/RTI or TI of backsheet is above the test values during the temperature test (MST 21), or above 90 °C, whichever is higher.	P
5.5.2.3.4 Polymeric insulating materials used as external parts			-
External polymeric parts of the PV module whose deterioration could impair the safety shall meet the following additional requirements:			-
a)	Flammability class minimum V-1 according to IEC 60695-11-10 (not applicable to insulation in thin layers; those are covered only by MST 24)	Not applicable.	N/A
b)	Ball pressure test according to IEC 60695-10-2 with a temperature of 75 °C (not applicable to insulation in thin layers)	Not applicable.	N/A
c)	Ignitability test (MST 24) in final application (laminated or the PV module)	IEC 61730-2 MST24 was passed.	P
d)	Peel test for proof of cemented joints according to IEC 61730-2 (MST 35), where applicable.	Not applicable.	N/A
e)	Lap shear strength test (MST 36), where applicable.	Not applicable.	N/A
5.5.2.3.5 Polymeric insulating parts supporting live parts			-
-	External parts of non-metallic material, parts of insulating material supporting live parts including connections, and parts of polymeric material providing supplementary insulation or reinforced insulation, shall be sufficiently resistant to heat if their deterioration could cause the PV module to fail to comply with this standard.	Yes	P

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.5.2.4 Polymeric materials used for mechanical functions			-
-	Materials used for mechanical functions shall have a minimum mechanical relative thermal endurance, relative thermal index or temperature index (RTE/RTI or TI) equal or greater than the max. normalized operating temperature of the material as measured in the particular mounting situation during temperature test (MST21), or 90°C, whichever is higher.	Yes	P
5.5.3 Metallic materials			-
5.5.3.1 General			-
-	In accordance with IEC 60950-1 metal parts designed for applications in climates with wet or humid ambient conditions shall not be in contact to metal parts that have a difference of their electrochemical potentials of more than 600 mV. Larger electrochemical potential differences are permissible if the contact points of these materials are designed to remain dry.	The frame is Anodized aluminum alloy. Relevant tests of IEC 61730-2 were passed.	P
-	Iron or mild steel as a part of the product shall be plated, painted, or enamelled for protection against corrosion. The corrosion protection at a minimum shall be at least equivalent to a zinc coating of 0.015 mm thickness.	Relevant tests of IEC 61730-2 were passed.	P
5.5.3.2 Current carrying parts			-
-	Under normal operation current-carrying parts shall have a sufficient mechanical strength and electrical conductivity. If environmental conditions may cause corrosion current-carrying materials (metal, polymeric based, etc.) shall be protected against corrosion, e.g. by coating.	Relevant tests of IEC 61730-2 were passed.	P
-	In case of current-carrying parts consisting of corrosion protective coated metal the coating shall be capable of preventing corrosion according to either one of ISO 1456, ISO 1461, ISO 2081 or ISO 2093. If the current-carrying parts may be stressed by abrasion, coated metal parts are not allowed.	Relevant tests of IEC 61730-2 were passed.	P
5.5.4 Adhesives			-
-	Adhesives shall be appropriate for the application. Compliance is checked by relevant tests of IEC 61730-2, including lap shear strength test (MST 36), peel test (MST 35), robustness of terminations test (MST 42), mechanical load test (MST 34), and visual inspection (MST 01), accessibility test (MST 11), wet leakage current test (MST 17) pre- and post-test sequences, where applicable.	Relevant tests of IEC 61730-2 were passed.	P
-	Additionally, if an adhesive is part of the relied upon electrical insulation it has to meet the requirements of 5.5.2.3.3.	Relevant tests of IEC 61730-2 were passed.	

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.6 Protection against electric shock			-
5.6.1 General			-
-	PV modules shall be provided with adequate protection against contact with hazardous live parts and shall 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			-
-	PV modules shall be constructed to provide adequate protection against accessibility to hazardous live parts (>35V DC).	Relevant tests of IEC 61730-2 were passed.	P
-	For Class 0 PV modules, accessible parts shall be separated from hazardous live parts by at least basic insulation. Compliance is checked by visual inspection (MST 01) and by accessibility test (MST 11).	Not applicable.	N/A
-	Class II PV modules shall be so constructed and enclosed that only parts separated from hazardous live parts by double or reinforced insulation are accessible. Compliance is checked by visual inspection (MST 01) and by accessibility test (MST 11).	Class II, compliance is checked by visual inspection (MST 01) and by accessibility test (MST 11).	P
-	In Class III PV modules live parts are not considered as hazardous, so a separation from accessible parts is not needed. To ensure sufficient functionality and protection against hazardous lighting arc, live parts of different polarity shall be separated by at least functional insulation. Compliance is checked by visual inspection (MST 01) and by accessibility test (MST 11).	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 shall 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 shall be so designed that, after mounting, the live parts are not accessible.	Relevant tests of IEC 61730-2 were passed.	P
5.6.2.3 Protection by means of insulation of live parts			-
-	An insulation material providing the sole insulation between a live part and an accessible metal part, or between uninsulated live parts not of the same potential, shall be of adequate thickness and of a material appropriate for the application.	Relevant tests of IEC 61730-2 were passed.	P

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.6.3 Insulation coordination			-
5.6.3.1 General			-
-	Position	Edge of module	-
5.6.3.2 Pollution degree			-
-	Pollution degree	1	-
5.6.3.3 Material group			-
-	Material group	I	-
5.6.3.4 Clearances (cl) and creepage distances (cr)			-
-	Min. determined creepage distance	13.5 mm	P
-	The module type has been evaluated for the following system voltage .....:	Vsys = 1500V	-
-	The modules are intended for a maximum operating altitude (meters above sea level) of [m] .....:	2000	-
5.6.4 Distance through insulation (dti)			-
5.6.4.1 General			-
-	The solid insulation properties of polymeric materials were verified through the tests outlined in IEC 61730-2.	Relevant tests of IEC 61730-2 were passed.	P
-	The distances through insulation (dti) are required for supplementary, double or reinforced insulation only as shown in lines 4 of Table 3 and 4 of IEC 61730-1	N/A	N/A
-	Polymeric materials for cemented insulation parts and insulation in thin layers shall withstand environmental, thermal, electrical and mechanical stresses as far as they occur. They shall comply with requirements according to 5.5.2 The insulation shall fulfil the material classification as given in IEC 60216-1, IEC 60216-2 and IEC 60216-5 (RTI/RTE/TI).	Relevant tests of IEC 61730-2 were passed.	P
5.6.4.2 Cemented joints			-
-	Cemented joints were considered	No	N/A
5.6.4.3 Insulation in thin layers			-
-	Thickness of relied upon insulation was checked by insulation thickness test (MST 04) in final application.	Relevant tests of IEC 61730-2 were passed.	P

IEC / EN 61730-1			
Clause	Requirement + Test	Result - Remark	Verdict
a)	Single-layer sheet - Minimum thickness according to lines 1b) of Table 3 and Table 4, as applicable depending on class (see table 1). Exception: The minimum thickness for a single layer is 30µm, even for system voltages < 600 V, since pinholes may be present. For thicknesses < 30µm a multilayer concept shall be adopted to mitigate risk. - RTI / RTE / TI as defined in 5.5.2.3.3. - Dielectric strength for reinforced insulation.	No such part	N/A
b)	Multi-layer sheets - The sum of thickness of all layers providing relied upon insulation shall be in compliance with values according to lines 1b) of Table 3 and Table 4, as applicable depending on class (see table 1). Each layer of a multi-layer (e.g. 2 layers, see Figure 4, example b1) and b2)) sheet providing relied upon insulation shall meet the following requirements: - RTI / RTE / TI as defined in 5.5.2.3.3. - Dielectric strength for basic insulation. If single layers are not characterized individually the following applies: The combined thickness of all layers (more and including 2 layers, see Figure 4, example b1), b2) and c)) providing relied upon insulation shall be in compliance with values according to Table 3 and Table 4 as applicable depending on class (see Table 1). RTI / RTE / TI shall be determined in the full layer stack or each layer providing relied upon insulation shall meet RTI / RTE / TI as defined in 5.5.2.3.3. Any changes in the stack or application require a new RTI / RTE / TI evaluation. Dielectric strength of entire multi-layer sheet providing relied upon insulation shall fulfill requirements for reinforced insulation.	Relevant tests of IEC 61730-2 were passed.	P
Supplementary information: N/A			

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

Test results of IEC / EN 61730-2

Module type: DHM-72X10FS-535W

10.2 Visual inspection (initial) - MQT01/MST01		-
Test date [MM/DD/YYYY].....:	07/12/2021 for 1#, 2# 06/30/2021 for 3#	-
Sample #	Nature and position of initial findings - comments or attach photos	-
1	No visual defects	P
2	No visual defects	P
3	No visual defects	P
Supplementary information: N/A		

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

10.4 Maximum power determination (initial) - MQT02/MST03							-
Test date [MM/DD/YYYY].....:			07/12/2021				-
Ambient temperature [°C].....:			Corrected to 25.0				-
Irradiance [W/m^2].....:			Corrected to 1000				-
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	-
2	49.21	41.16	13.60	12.96	533.6	79.74	-
Supplementary information: N/A							

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

10.13 Insulation test (initial) - MQT03/MST16				-
Test date [MM/DD/YYYY].....:		07/12/2021		-
Test voltage applied [V].....:		2 minutes of 1500 and 1 minute of 8000		-
Sample #	Required [MΩ]	Measured [MΩ]	Dielectric breakdown?	-
2	15.5	>1000	No	P
Supplementary information: Minimum requirement according to the standard is 40MΩ·m^2. Area of the module is 2.58m^2.				

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

10.14 Wet leakage current test (initial) - MQT15/MST17			-
Test date [MM/DD/YYYY].....:		07/12/2021	-
Test voltage applied [V].....:		2 minutes of 1500	-
Solution resistivity [Ω/cm] / <3500 .....:		1872	-
Solution temperature [°C] / 22±2 .....:		23.6	-
Sample #	Required [MΩ]	Measured [MΩ]	-
2	15.5	>1000	P
Supplementary information: Minimum requirement according to the standard is 40MΩ·m^2. Area of the module is 2.58m^2.			

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

10.11 Continuity test of equipotential bonding (initial) - MST13				-
Test date [MM/DD/YYYY].....:		07/12/2021		-
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 #	Required resistance [Ω]	Measured voltage [V]	Calculated resistance [Ω]	-
2	<0.1	A: 0.069 B: 0.036 C: 0.033	A: 0.001 B: <0.001 C: <0.001	P
Supplementary information: N/A				

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

10.9 Accessibility test (initial) - MST11		-
Test date [MM/DD/YYYY].....:	07/12/2021	-
Sample #	Requirements	-
2	☒ At no time during the test, there is a resistance of less than 1MΩ between the test fixture and the PV module live part. ☒ At no time during the test, the probe contacts any live electrical part.	P
Supplementary information: N/A		

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

10.21 Module breakage test - MST32		-
Test date [MM/DD/YYYY].....:	07/23/2021	-
Weight of impactor [kg].....:	45.5	-
Thickness of module [mm] .....:	30	-
Mounting technique used .....:	Mounting holes (8 points)	-
Module Breakage? .....:	☒ No breakage ☐ Broke at 300mm	-
Weight of particles in case of breakage [g].....:	N/A	-
Sample #	Requirements	-
3	☒ The module did not separate from the mounting structure or framing ☒ The sample did not break ☐ Breakage occurred, but no shear or opening large enough for a 76 mm diameter sphere to pass freely has developed. ☐ Breakage occurred, but no particles larger than 65 cm² have been ejected from the sample.	P
Supplementary information: N/A		

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

10.2 Visual inspection (final, after 48-96h wait time) - MQT01/MST01		-
Sample #	Nature and position of initial findings - comments or attach photos	-
2	No visual defects	P
Supplementary information: N/A		

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

10.11 Continuity test of equipotential bonding (final) - MST13				-
Test date [MM/DD/YYYY].....:		07/23/2021		-
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 #	Required resistance [Ω]	Measured voltage [V]	Calculated resistance [Ω]	-
2	<0.1	A: 0.076 B: 0.038 C: 0.033	A: 0.001 B: 0.001 C: <0.001	P
Supplementary information: N/A				

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

10.9 Accessibility test (final) - MST11		-
Test date [MM/DD/YYYY].....:	07/23/2021	-
Sample #	Requirements	-
2	☒ At no time during the test, there is a resistance of less than 1MΩ between the test fixture and the PV module live part. ☒ At no time during the test, the probe contacts any live electrical part.	P
Supplementary information: N/A		

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

10.4 Maximum power determination (final) - MQT02/MST03							-
Test date [MM/DD/YYYY].....:			07/23/2021				-
Ambient temperature [°C].....:			Corrected to 25.0				-
Irradiance [W/m^2].....:			Corrected to 1000				-
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	-
2	49.10	41.07	13.62	12.99	533.6	79.82	P
Supplementary information: The IV curve show no additional kinks or other unusual characteristics as compared to the initial IV curve.							

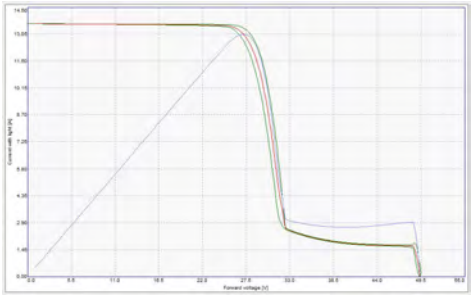
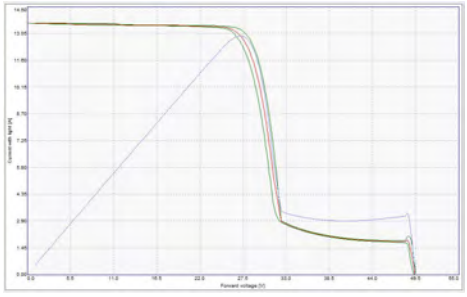
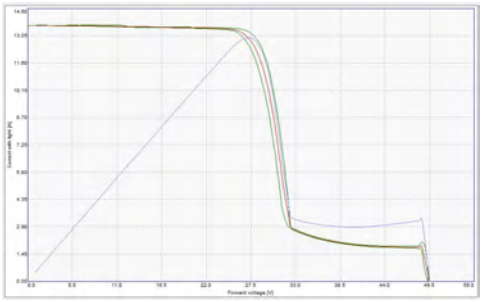
IEC / EN 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict

10.6 Durability of markings - MST05		-
Test date [MM/DD/YYYY].....:	07/23/2021 for 1# 07/19/2021 for 2#	-
Sample #	Requirements	-
1	☒ Marking is legible ☒ Not possible to remove marking plates easily ☒ No curling occurred	P
2	☒ Marking is legible ☒ Not possible to remove marking plates easily ☒ No curling occurred	P
Supplementary information: N/A		

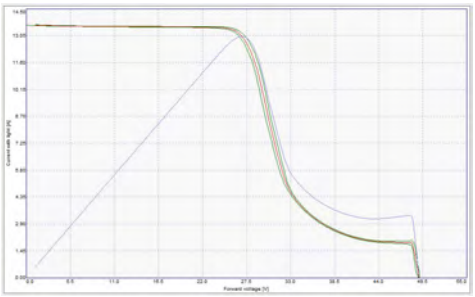
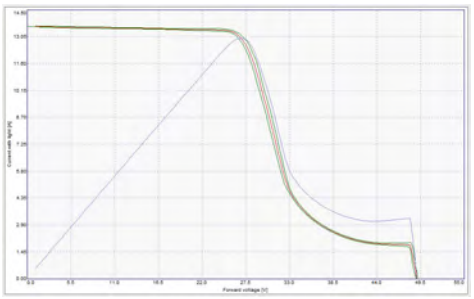
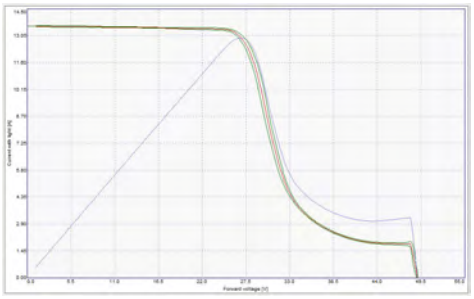
IEC / EN 61730-2			
Clause	Requirement + Test	Result - Remark	Verdict

10.7 Sharp edge test - MST06		-
Test date [MM/DD/YYYY].....:	07/23/2021 for 1# 07/19/2021 for 2#	-
Sample #	Requirements	-
1	☒ No sharp edges, burrs, etc. ☒ Smooth surfaces	P
2	☒ No sharp edges, burrs, etc. ☒ Smooth surfaces	P
Supplementary information: Compliance is checked by inspection.		

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

10.8 Bypass diode functionality test - MQT18.2/MST07		-
Sample #.....:	1	-
Test date [MM/DD/YYYY].....:	07/23/2021	-
☐ Method A		-
Ambient temperature [°C].....:	N/A	-
Current flow applied [A] .....:	N/A	-
$V_{FMrated}$ [V] .....:	N/A	-
N x $V_{FMrated}$ [V].....:	N/A	-
Measured VFM [V].....:	N/A	N/A
☒ Method B		-
Diode #	IV curve after shading	P
1		P
2		P
3		P
Supplementary information: N/A		

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

Sample # .....:	2	-
Test date [MM/DD/YYYY].....:	07/23/2021	-
☐ Method A		-
Ambient temperature [°C].....:	N/A	-
Current flow applied [A] .....:	N/A	-
$V_{FMrated}$ [V] .....:	N/A	-
N x $V_{FMrated}$ [V].....:	N/A	-
Measured VFM [V].....:	N/A	N/A
☒ Method B		-
Diode #	IV curve after shading	P
1		P
2		P
3		P
Supplementary information: N/A		

Annex 1: Constructional Data Form (CDF)

File No.: PVP04006/21P-01 Attached to Test Report No.: 492011236.008

CDF (Constructional Data Form) for Electrical Products

Applicant ..... :	**Anhui Daheng Energy Technology Co., Ltd.** 6#A 1-3F, Gongtouxinglu Science & Technology Industrial Park Luyang District, Hefei City, Anhui Province, P.R.China
Manufacturer..... :	**Anhui Daheng Energy Technology Co., Ltd.** No.358,Tianhe Road, Luyang industrial Park Hefei City, Anhui Province, P.R. China
Product..... :	Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
Standard(s) ..... :	IEC / EN 61215-1:2016; IEC / EN 61215-1-1:2016; IEC 61215-2:2016 / EN 61215-2:2017 + AC:2017 + AC:2018; IEC 61730-1:2016 / EN IEC 61730-1:2018 + AC:2018; IEC 61730-2:2016 / EN IEC 61730-2:2018 + AC:2018.
Trade mark..... :	DAH
Module type(s) ..... :	**PV Modules with 6" Mono-crystalline Silicon Solar Cells:** 72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 72 cells: DHM72/FS-xxxW (xxx = 325 - 370, in increment of 5) 60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) 60 cells: DHM60/FS-xxxW (xxx = 275 - 310, in increment of 5) 72 cells: DHM72X-xxxW (xxx= 370 - 390, in increment of 5) 72 cells: DHM72X/FS-xxxW (xxx= 370 - 390, in increment of 5) 60 cells: DHM60X-xxxW (xxx= 310 - 325, in increment of 5) 60 cells: DHM60X/FS-xxxW (xxx= 310 - 325, in increment of 5) **PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: HCM72-xxxW (xxx = 350 - 390, in increment of 5) 144 cells: HCM72/FS-xxxW (xxx = 350 - 390, in increment of 5) 120 cells: HCM60-xxxW (xxx = 290 - 325, in increment of 5) 120 cells: HCM60/FS-xxxW (xxx = 290 - 325, in increment of 5) 156 cells: HCM78X9-xxxW (xxx = 415 - 455, in increment of 5) 156 cells: HCM78X9/FS-xxxW (xxx = 415 - 455, in increment of 5) 144 cells: HCM72X9-xxxW (xxx = 385 - 420, in increment of 5) 144 cells: HCM72X9/FS-xxxW (xxx = 385 - 420, in increment of 5) 120 cells: HCM60X9-xxxW (xxx = 320 - 350, in increment of 5) 120 cells: HCM60X9/FS-xxxW (xxx = 320 - 350, in increment of 5) 144 cells: DHM-72L9-xxxW (xxx = 430 - 465, in increment of 5) 144 cells: DHM-72L9/FS-xxxW (xxx = 430 - 465, in increment of 5) 144 cells: DHM-72L9/BF-xxxW (xxx = 430 - 465, in increment of 5)

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Evan Zhang
(Signature of authorized TÜV NORD CERT engineer)

PV-F-026 CDF Page 1 of 19 Version 1.2

	144 cells: DHM-72L9/FS/BF-xxxW (xxx = 430 - 465, in increment of 5) 120 cells: DHM-60L9-xxxW (xxx = 360 - 385, in increment of 5) 120 cells: DHM-60L9/FS-xxxW (xxx = 360 - 385, in increment of 5) 120 cells: DHM-60L9/BF-xxxW (xxx = 360 - 385, in increment of 5) 120 cells: DHM-60L9/FS/BF-xxxW (xxx = 360 - 385, in increment of 5) **PV Modules with 7" Half-cut Mono-crystalline Silicon Solar Cells:** 144 cells: DHM-72X10-xxxW (xxx = 525 - 555, in increment of 5) 144 cells: DHM-72X10/FS-xxxW (xxx = 525 - 555, in increment of 5) 144 cells: DHM-72X10/BF-xxxW (xxx = 525 - 555, in increment of 5) 144 cells: DHM-72X10/FS/BF-xxxW (xxx = 525 - 555, in increment of 5) 132 cells: DHM-66X10-xxxW (xxx = 485 - 505, in increment of 5) 132 cells: DHM-66X10/FS-xxxW (xxx = 485 - 505, in increment of 5) 132 cells: DHM-66X10/BF-xxxW (xxx = 485 - 505, in increment of 5) 132 cells: DHM-66X10/FS/BF-xxxW (xxx = 485 - 505, in increment of 5) 120 cells: DHM-60X10-xxxW (xxx = 440 - 460, in increment of 5) 120 cells: DHM-60X10/FS-xxxW (xxx = 440 - 460, in increment of 5) 120 cells: DHM-60X10/BF-xxxW (xxx = 440 - 460, in increment of 5) 120 cells: DHM-60X10/FS/BF-xxxW (xxx = 440 - 460, in increment of 5) 108 cells: DHM-54X10-xxxW (xxx = 395 - 415, in increment of 5) 108 cells: DHM-54X10/FS-xxxW (xxx = 395 - 415, in increment of 5) 108 cells: DHM-54X10/BF-xxxW (xxx = 395 - 415, in increment of 5) 108 cells: DHM-54X10/FS/BF-xxxW (xxx = 395 - 415, in increment of 5) **PV Modules with 6" Poly-crystalline Silicon Solar Cells:** 72 cells: DHP72-xxxW (xxx= 310 - 335, in increment of 5) 60 cells: DHP60-xxxW (xxx= 260 - 280, in increment of 5) **PV Modules with 6" Half-cut Poly-crystalline Silicon Solar Cells:** 156 cells: HCP78X9-xxxW (xxx = 370 - 415, in increment of 5) 144 cells: HCP72X9-xxxW (xxx = 340 - 380, in increment of 5) 120 cells: HCP60X9-xxxW (xxx = 285 - 320, in increment of 5)

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Buan Zhang
(Signature of authorized TÜV NORD CERT engineer)

Electrical ratings:

PV Modules with 6" Mono-crystalline Silicon Solar Cells:

Module type ..... :	72 cells: DHM72-xxxW (xxx = 325 - 370, in increment of 5) 72 cells: DHM72/FS-xxxW (xxx = 325 - 370, in increment of 5) With solar cell 156M-210five.		
Dimensions [mm] / l x w x h..... :	1956 x 991 x 30/32/35/40		
Rated Pmpp [W] ..... :	325; 330; 335; 340; 345; 350; 355; 360; 365; 370	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	45.9; 46.1; 46.3; 46.5; 46.7; 46.9; 47.0; 47.2; 47.4; 47.6	Tolerance of rated Voc [%].....:	±3
Rated Isc [A] ..... :	9.19; 9.26; 9.36; 9.45; 9.50; 9.60; 9.69; 9.76; 9.82; 9.91	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	14.75	Fuse rating [A] .....:	16
Design load (positive) [Pa] ..... :	3600	Safety factor (positive).....:	1.5
Design load (negative) [Pa] ..... :	1600	Safety factor (negative) .....:	1.5

Module type ..... :	60 cells: DHM60-xxxW (xxx = 275 - 310, in increment of 5) 60 cells: DHM60/FS-xxxW (xxx = 275 - 310, in increment of 5) With solar cell 156M-210five.		
Dimensions [mm] / l x w x h..... :	1650 x 991 x 30/32/35/40		
Rated Pmpp [W] ..... :	275; 280; 285; 290; 295; 300; 305; 310	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	38.8; 39.0; 39.2; 39.5; 39.7; 39.9; 40.2; 40.4	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	9.25; 9.35; 9.44; 9.50; 9.55; 9.64; 9.72; 9.81	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	14.75	Fuse rating [A] .....:	16
Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back.....:	1.5

Module type ..... :	72 cells: DHM72X-xxxW (xxx= 370 - 390, in increment of 5) 72 cells: DHM72X/FS-xxxW (xxx= 370 - 390, in increment of 5) With solar cell 158M-five.

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Evan Zhang
(Signature of authorized TÜV NORD CERT engineer)

File No.: PVP04006/21P-01 Attached to Test Report No.: 492011236.008

Dimensions [mm] / l x w x h ..... :	1979 x 1002 x 30/32/35/40		
Rated Pmpp [W]..... :	370; 375; 380; 385; 390	Tolerance of rated Pmpp [%] .....:	±3
Rated Voc [V]..... :	47.9; 48.1; 48.3; 48.6; 48.8	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	9.99; 10.08; 10.16; 10.21; 10.28	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	13.75	Fuse rating [A] .....:	16
Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back.....:	1.5

Module type ..... :	60 cells: DHM60X-xxxW (xxx= 310 - 325, in increment of 5) 60 cells: DHM60X/FS-xxxW (xxx= 310 - 325, in increment of 5) With solar cell 158M-five.		
Dimensions [mm] / l x w x h ..... :	1665 x 1002 x 30/32/35/40		
Rated Pmpp [W]..... :	310; 315; 320; 325	Tolerance of rated Pmpp [%] .....:	±3
Rated Voc [V]..... :	40.0; 40.2; 40.4; 40.6	Tolerance of rated Voc [%].....:	±3
Rated Isc [A] ..... :	10.01; 10.10; 10.20; 10.29	Tolerance of rated Isc [%] .....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140 .....:	Class II
Min-creepage distance [mm] ..... :	13.75	Fuse rating [A].....:	16
Design load [Pa] / front ..... :	3600	Safety factor / front.....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Evan Zhang
(Signature of authorized TÜV NORD CERT engineer)

PV-F-026 CDF Page 4 of 19 Version 1.2

PV Modules with 6" Half-cut Mono-crystalline Silicon Solar Cells:

Module type ..... :	144 cells: HCM72-xxxW (xxx = 350 - 390, in increment of 5) 144 cells: HCM72/FS-xxxW (xxx = 350 - 390, in increment of 5) With solar cell 156M-210five (half-cut).		
Dimensions [mm] / l x w x h ..... :	2000 x 991 x 30/32/35/40		
Rated Pmpp [W] ..... :	350; 355; 360; 365; 370; 375; 380; 385; 390	Tolerance of rated Pmpp [%] ..... :	±3
Rated Voc [V] ..... :	46.5; 46.8; 47.0; 47.3; 47.5; 47.8; 48.2; 48.5; 48.9	Tolerance of rated Voc [%] ..... :	±3
Rated Isc [A] ..... :	9.73; 9.80; 9.86; 9.91; 9.97; 10.03; 10.06; 10.09; 10.12	Tolerance of rated Isc [%] ..... :	±3
Maximum system voltage [V] ..... :	1500	Safety class acc. to IEC 61140 ..... :	Class II
Min-creepage distance [mm] ..... :	15.5	Fuse rating [A] ..... :	20
Design load [Pa] / front ..... :	3600	Safety factor / front ..... :	1.5
Design load [Pa] / back ..... :	1600	Safety factor / back ..... :	1.5

Module type ..... :	120 cells: HCM60-xxxW (xxx = 290 - 325, in increment of 5) 120 cells: HCM60/FS-xxxW (xxx = 290 - 325, in increment of 5) With solar cell 156M-210five (half-cut).		
Dimensions [mm] / l x w x h ..... :	1678 x 991 x 30/32/35/40		
Rated Pmpp [W] ..... :	295; 300; 305; 310; 315; 320; 325	Tolerance of rated Pmpp [%] ..... :	±3
Rated Voc [V] ..... :	38.7; 39.0; 39.3; 39.6; 39.9; 40.2; 40.4	Tolerance of rated Voc [%] ..... :	±3
Rated Isc [A] ..... :	9.84; 9.91; 9.96; 10.03; 10.10; 10.15; 10.21	Tolerance of rated Isc [%] ..... :	±3
Maximum system voltage [V] ..... :	1500	Safety class acc. to IEC 61140 ..... :	Class II
Min-creepage distance [mm] ..... :	15.5	Fuse rating [A] ..... :	20
Design load [Pa] / front ..... :	3600	Safety factor / front ..... :	1.5
Design load [Pa] / back ..... :	1600	Safety factor / back ..... :	1.5

Module type ..... :	156 cells: HCM78X9-xxxW (xxx = 415 - 455, in increment of 5) 156 cells: HCM78X9/FS-xxxW (xxx = 415 - 455, in increment of 5) With solar cell 158M-nine (half-cut).
Dimensions [mm] / l x w x h ..... :	2172 x 1002 x 30/32/35/40

Confirmation of the applicant:
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Ryan Zhang
(Signature of authorized TÜV NORD CERT engineer)

Rated Pmpp [W] ..... :	415; 420; 425; 430; 435; 440; 445; 450; 455	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	52.1; 52.3; 52.5; 52.7; 52.9; 53.1; 53.3; 53.5; 53.7	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	10.06; 10.12; 10.18; 10.24; 10.30; 10.37; 10.42; 10.47; 10.54	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	14.88	Fuse rating [A] .....:	20
Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Module type ..... :	144 cells: HCM72X9-xxxW (xxx = 385 - 420, in increment of 5) 144 cells: HCM72X9/FS-xxxW (xxx = 385 - 420, in increment of 5) With solar cell 158M-nine (half-cut).		
Dimensions [mm] / l x w x h..... :	2010 x 1002 x 30/32/35/40		
Rated Pmpp [W] ..... :	385; 390; 395; 400; 405; 410; 415; 420	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	48.4; 48.6; 48.8; 49.0; 49.2; 49.4; 49.6; 49.8	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	10.21;10.24;10.27; 10.32;10.35;10.40; 10.43; 10.47	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	14.88	Fuse rating [A] .....:	20
Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Module type ..... :	120 cells: HCM60X9-xxxW (xxx = 320 - 350, in increment of 5) 120 cells: HCM60X9/FS-xxxW (xxx = 320 - 350, in increment of 5) With solar cell 158M-nine (half-cut).		
Dimensions [mm] / l x w x h..... :	1686 x 1002 x 30/32/35/40		
Rated Pmpp [W] ..... :	320; 325; 330; 335; 340; 345; 350	Tolerance of rated Pmpp [%].....:	±3

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Byan Zhang
(Signature of authorized TÜV NORD CERT engineer)

Rated Voc [V] ..... :	40.2; 40.4; 40.6; 40.8; 41.0; 41.2; 41.4	Tolerance of rated Voc [%] ..... :	±3
Rated Isc [A] ..... :	10.20; 10.27; 10.33; 10.39; 10.46; 10.53; 10.59	Tolerance of rated Isc [%] ..... :	±3
Maximum system voltage [V] ..... :	1500	Safety class acc. to IEC 61140 ..... :	Class II
Min-creepage distance [mm] ..... :	14.88	Fuse rating [A] ..... :	20
Design load [Pa] / front ..... :	3600	Safety factor / front ..... :	1.5
Design load [Pa] / back ..... :	1600	Safety factor / back ..... :	1.5

Module type ..... :	144 cells: DHM-72L9-xxxW (xxx = 430 - 465, in increment of 5) 144 cells: DHM-72L9/FS-xxxW (xxx = 430 - 465, in increment of 5) 144 cells: DHM-72L9/BF-xxxW (xxx = 430 - 465, in increment of 5) 144 cells: DHM-72L9/FS/BF-xxxW (xxx = 430 - 465, in increment of 5) With solar cell 166M-nine (half-cut).		
Dimensions [mm] / l x w x h ..... :	(1) 2108 x 1048 x 30/32/35/40 (2) 2094 x 1038 x 30/32/35/40 (3) 2115 x 1052 x 30/32/35/40		
Rated Pmpp [W] ..... :	430; 435; 440; 445; 450; 455; 460; 465	Tolerance of rated Pmpp [%] ..... :	±3
Rated Voc [V] ..... :	48.70; 48.85; 49.00; 49.15; 49.30; 49.45; 49.60; 49.75	Tolerance of rated Voc [%] ..... :	±3
Rated Isc [A] ..... :	11.23; 11.26; 11.29; 11.32; 11.35; 11.38; 11.41; 11.44	Tolerance of rated Isc [%] ..... :	±3
Maximum system voltage [V] ..... :	1500	Safety class acc. to IEC 61140 ..... :	Class II
Min-creepage distance [mm] ..... :	(1) 14.75 (2) 13.75	Fuse rating [A] ..... :	20
Design load [Pa] / front ..... :	3600	Safety factor / front ..... :	1.5
Design load [Pa] / back ..... :	1600	Safety factor / back ..... :	1.5

Module type ..... :	120 cells: DHM-60L9-xxxW (xxx = 360 - 385, in increment of 5) 120 cells: DHM-60L9/FS-xxxW (xxx = 360 - 385, in increment of 5) 120 cells: DHM-60L9/BF-xxxW (xxx = 360 - 385, in increment of 5) 120 cells: DHM-60L9/FS/BF-xxxW (xxx = 360 - 385, in increment of 5) With solar cell 166M-nine (half-cut).
Dimensions [mm] / l x w x h ..... :	(1) 1765 x 1048 x 30/32/35/40

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Evan Zhang
(Signature of authorized TÜV NORD CERT engineer)

File No.: PVP04006/21P-01 Attached to Test Report No.: 492011236.008

	(2) 1755 x 1038 x 30/32/35/40		
Rated Pmpp [W] ..... :	360; 365; 370; 375; 380; 385	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	40.6; 40.8; 41.0; 41.2; 41.4; 41.6	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	11.24; 11.30; 11.36; 11.42; 11.48; 11.54	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	(1) 14.75 (2) 13.8	Fuse rating [A] .....:	20
Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Evan Zhang
(Signature of authorized TÜV NORD CERT engineer)

PV-F-026 CDF Page 8 of 19 Version 1.2

PV Modules with 7" Half-cut Mono-crystalline Silicon Solar Cells:

Module type ..... :	144 cells: DHM-72X10-xxxW (xxx = 525 - 555, in increment of 5) 144 cells: DHM-72X10/FS-xxxW (xxx = 525 - 555, in increment of 5) 144 cells: DHM-72X10/BF-xxxW (xxx = 525 - 555, in increment of 5) 144 cells: DHM-72X10/FS/BF-xxxW (xxx = 525 - 555, in increment of 5) With solar cell 182M-ten (half-cut).		
Dimensions [mm] / l x w x h..... :	(1) 2279 x 1134 x 30/32/35/40 (2) 2256 x 1134 x 30/32/35/40 (3) 2274 x 1134 x 30/32/35/40 (4) 2256 x 1133 x 30/32/35/40		
Rated Pmpp [W] ..... :	525; 530; 535; 540; 545; 550; 555	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	49.2; 49.4; 49.6; 49.8; 50.0; 50.2; 50.4	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	13.48; 13.54; 13.60; 13.66; 13.72; 13.78; 13.84	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	13.75	Fuse rating [A] .....:	20
Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Module type ..... :	132 cells: DHM-66X10-xxxW (xxx = 485 - 505, in increment of 5) 132 cells: DHM-66X10/FS-xxxW (xxx = 485 - 505, in increment of 5) 132 cells: DHM-66X10/BF-xxxW (xxx = 485 - 505, in increment of 5) 132 cells: DHM-66X10/FS/BF-xxxW (xxx = 485 - 505, in increment of 5) With solar cell 182M-ten (half-cut).		
Dimensions [mm] / l x w x h..... :	(1) 2094 x 1134 x 30/32/35/40 (2) 2074 x 1134 x 30/32/35/40		
Rated Pmpp [W] ..... :	485; 490; 495; 500; 505	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	45.2; 45.4; 45.6; 45.8; 46.0	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	13.60; 13.66; 13.72; 13.78; 13.84	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	13.75	Fuse rating [A] .....:	20

Confirmation of the applicant:
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Buan Zhang
(Signature of authorized TÜV NORD CERT engineer)

Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Module type ..... :	120 cells: DHM-60X10-xxxW (xxx = 440 - 460, in increment of 5) 120 cells: DHM-60X10/FS-xxxW (xxx = 440 - 460, in increment of 5) 120 cells: DHM-60X10/BF-xxxW (xxx = 440 - 460, in increment of 5) 120 cells: DHM-60X10/FS/BF-xxxW (xxx = 440 - 460, in increment of 5) With solar cell 182M-ten (half-cut).		
Dimensions [mm] / l x w x h..... :	(1) 1910 x 1134 x 30/32/35/40 (2) 1891 x 1134 x 30/32/35/40 (3) 1903 x 1134 x 30/32/35/40		
Rated Pmpp [W] ..... :	440; 445; 450; 455; 460	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	41.2; 41.4; 41.6; 41.8; 42.0	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	13.54; 13.60; 13.66; 13.72; 13.78	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	13.75	Fuse rating [A] .....:	20
Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Module type ..... :	108 cells: DHM-54X10-xxxW (xxx = 395 - 415, in increment of 5) 108 cells: DHM-54X10/FS-xxxW (xxx = 395 - 415, in increment of 5) 108 cells: DHM-54X10/BF-xxxW (xxx = 395 - 415, in increment of 5) 108 cells: DHM-54X10/FS/BF-xxxW (xxx = 395 - 415, in increment of 5) With solar cell 182M-ten (half-cut).		
Dimensions [mm] / l x w x h..... :	(1) 1722 x 1134 x 30/32/35/40 (2) 1710 x 1134 x 30/32/35/40		
Rated Pmpp [W] ..... :	395; 400; 405; 410; 415	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	36.6; 36.8; 37.0; 37.2; 37.4	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	13.42; 13.48; 13.54; 13.60; 13.66	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	13.75	Fuse rating [A] .....:	20

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Buan Zhang
(Signature of authorized TÜV NORD CERT engineer)

Design load [Pa] / front ..... :	3600	Safety factor / front ..... :	1.5
Design load [Pa] / back ..... :	1600	Safety factor / back ..... :	1.5

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Ryan Zhang
(Signature of authorized TÜV NORD CERT engineer)

PV Modules with 6" Poly-crystalline Silicon Solar Cells:

Module type ..... :	72 cells: DHP72-xxxW (xxx = 310 - 335, in increment of 5) With solar cell P156.75-5BB.		
Dimensions [mm] / l x w x h..... :	1956 x 991 x 40		
Rated Pmpp [W] ..... :	310; 315; 320; 325; 330; 335	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	45.4; 45.6; 45.8; 45.9; 46.1; 46.3	Tolerance of rated Voc [%].....:	±3
Rated Isc [A] ..... :	8.89; 9.00; 9.10; 9.20; 9.29; 9.39	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	14.75	Fuse rating [A] .....:	16
Design load [Pa] / front..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Module type ..... :	60 cells: DHP60-xxxW (xxx = 260 - 280, in increment of 5) With solar cell P156.75-5BB.		
Dimensions [mm] / l x w x h..... :	1650 x 991 x 35		
Rated Pmpp [W] ..... :	260; 265; 270; 275; 280	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	38.1; 38.3; 38.4; 38.5; 38.7	Tolerance of rated Voc [%].....:	±3
Rated Isc [A] ..... :	9.01; 9.10; 9.22; 9.25; 9.34	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	14.75	Fuse rating [A] .....:	16
Design load [Pa] / front..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Confirmation of the applicant:
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Evan Zhang
(Signature of authorized TÜV NORD CERT engineer)

PV Modules with 6" Half-cut Poly-crystalline Silicon Solar Cells:

Module type ..... :	156 cells: HCP78X9-xxxW (xxx = 370 - 415, in increment of 5) With solar cell P158.75-9BB(half-cut).		
Dimensions [mm] / l x w x h..... :	2172 x 1002 x 40		
Rated Pmpp [W] ..... :	370; 375; 380; 385; 390; 395; 400; 405; 410; 415	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	50.3; 50.5; 50.6; 50.8; 51.0; 51.2; 51.4; 51.5; 51.6; 51.8	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	9.52; 9.59; 9.65; 9.71; 9.76; 9.82; 9.87; 9.93; 9.97; 10.04	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	14.88	Fuse rating [A] .....:	20
Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Module type ..... :	144 cells: HCP72X9-xxxW (xxx = 340 - 380, in increment of 5) With solar cell P158.75-9BB(half-cut).		
Dimensions [mm] / l x w x h..... :	2010 x 1002 x 40		
Rated Pmpp [W] ..... :	340; 345; 350; 355; 360; 365; 370; 375; 380	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	46.2; 46.4; 46.7; 47.0; 47.2; 47.4; 47.6; 47.8; 48.0	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	9.53; 9.59; 9.64; 9.71; 9.78; 9.86; 9.93; 10.01; 10.06	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	14.88	Fuse rating [A] .....:	20
Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Module type ..... :	120 cells: HCP60X9-xxxW (xxx = 285 - 320, in increment of 5) With solar cell P158.75-9BB(half-cut).
Dimensions [mm] / l x w x h..... :	1686 x 1002 x 35

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Bvan Zhang
(Signature of authorized TÜV NORD CERT engineer)

File No.: PVP04006/21P-01 Attached to Test Report No.: 492011236.008

Rated Pmpp [W] ..... :	285; 290; 295; 300; 305; 310; 315; 320	Tolerance of rated Pmpp [%].....:	±3
Rated Voc [V]..... :	38.8; 39.2; 39.5; 39.8; 40.1; 40.4; 40.7; 41.0	Tolerance of rated Voc [%] .....:	±3
Rated Isc [A] ..... :	9.53; 9.60; 9.67; 9.77; 9.85; 9.93; 10.02; 10.10	Tolerance of rated Isc [%].....:	±3
Maximum system voltage [V]..... :	1500	Safety class acc. to IEC 61140.....:	Class II
Min-creepage distance [mm] ..... :	14.88	Fuse rating [A] .....:	20
Design load [Pa] / front ..... :	3600	Safety factor / front .....:	1.5
Design load [Pa] / back..... :	1600	Safety factor / back .....:	1.5

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

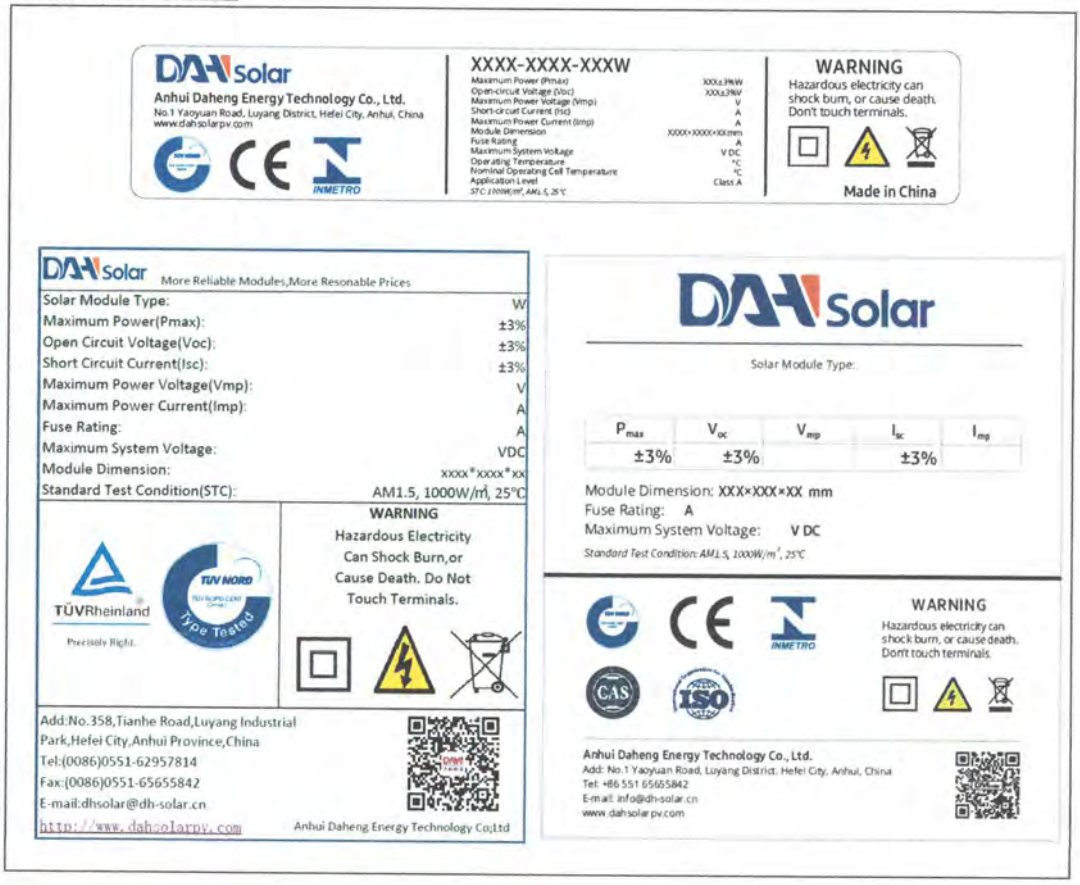
(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Buan Zhang
(Signature of authorized TÜV NORD CERT engineer)

File No.: PVP04006/21P-01 Attached to Test Report No.: 492011236.008

Copy of marking plate:



Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Buan Zhang
(Signature of authorized TÜV NORD CERT engineer)

File No.: PVP04006/21P-01 Attached to Test Report No.: 492011236.008

List of critical materials and components:

Object	Manufacturer	Type	Technical Data	Remark
Components				
6" mono cell 1	Zhejiang Jinko Solar Co., Ltd	156M-210five	Dimension (w x l) = 156.75mm x 156.75mm Cell area = 24570.56mm² Thickness = 200 ± 20µm PERC Cell 5 busbars	Tested with PV modules
6" mono cell 2	Zhejiang Jinko Solar Co., Ltd	156M-210five (half-cut)	Dimension (w x l) = 156.75 mm x 78.375 mm Cell area = 12285.28mm² Thickness = 200 ± 20µm PERC Cell 5 busbars	Tested with PV modules
6" mono cell 3	Zhejiang Jinko Solar Co., Ltd	158M-nine (half-cut)	Dimension (w x l) = 158.75 mm x 79.375 mm Cell area = 12600.78mm² Thickness = 200 ± 20µm PERC Cell 9 busbars	Tested with PV modules
6" mono cell 4	Zhejiang Jinko Solar Co., Ltd	158M-five	Dimension (w x l) = 158.75 mm x 158.75 mm Cell area = 25201.56mm² Thickness = 200 ± 20µm PERC Cell 5 busbars	Tested with PV modules
6" mono cell 5	Tongwei solar (Chengdu) Co., Ltd.	166M-nine (half-cut)	Dimension (w x l) =166 mm x 83mm Cell area = 13708.85mm² Thickness = 190 ± 30µm PERC Cell 9 busbars	Tested with PV modules
7" mono cell 6	Ahhui Daheng Energy Technology Co., Ltd.	182M-ten (half-cut)	Dimension (w x l) =182 mm x 91mm Cell area = 16507.5mm² Thickness = 185 ± 18.5µm PERC Cell 10 busbars	Tested with PV modules
6" poly cell 1	Ahhui Daheng Energy Technology Co., Ltd.	P156.75-5BB	Dimension (w x l) = 156.8 mm x 156.8 mm Cell area = 24586.24mm² Thickness = 200 ± 20µm 5 busbars	Tested by main tested type
6" poly cell 2	Ahhui Daheng Energy Technology Co., Ltd.	P158.75-9BB (half-cut)	Dimension (w x l) = 158.75 mm x 79.375 mm Cell area = 12600.78mm² Thickness = 200 ± 20µm PERC Cell 9 busbars	Tested with PV modules

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Evan Zhang
(Signature of authorized TÜV NORD CERT engineer)

File No.: PVP04006/21P-01 Attached to Test Report No.: 492011236.008

Object	Manufacturer	Type	Technical Data	Remark
Front cover	CAIHONG (HEFEI) PHOTOVOLTAIC Co., Ltd.	AR coating tempered glass	Thickness = 3.2 mm	Tested with PV modules
Rear cover	Crown Advanced Material Co., Ltd	Crown BE-xn	Material: PVDF/PU/PET/PU/PO Thickness: 20µm / 12.5µm / 275µm / 12.5µm / 50µm CTI: 600V	Tested with PV modules CTI report no.: 15042005037 Issued by TÜV Rheinland
Encapsulation material	Shanghai HiUV new material Limited by Share Ltd	S201MT1 (closed to glass) / S201MT2 (closed to backsheet)	Thickness: 0.60 ± 0.10mm CTI: 600V	Tested with PV modules CTI report no.: GZIN1605022185PS Issued by SGS
Frame parts	Hefei Hongtang PV Technology Co., Ltd.	6063-T5	Thickness = 35/40mm (35mm thickness is only for 60 cell series.) Installation method: clamping	Tested with PV modules
	Anhui Xinbo Aluminium Industry Share Co., Ltd.	6005-T6	Thickness = 35/40mm Installation method: clamping	Tested with PV modules
	Anhui Xinbo Aluminium Industry Share Co., Ltd.	6005-T6	Thickness = 30/32mm Installation method: mounting holes	Tested with PV modules
Adhesive (frame)	SUZHOU TONSAN ADHESIVE CO., LTD.	1527	Color: white	Tested with PV modules
Internal wiring (for interconnection cell-to-cell bus bar)	TaiCang JuRen PV Material CO.,Ltd.	Copper belt with tin plated	Width: 0.9mm Thickness: 0.25mm Sn63Pb37	Tested with PV modules
	TaiCang JuRen PV Material CO.,Ltd.	Copper belt with tin plated	Diameter: 0.35mm Sn63Pb37	Tested with PV modules
	TaiCang JuRen PV Material CO.,Ltd.	Copper belt with tin plated	Diameter: 0.32mm Sn63Pb37	Tested with PV modules
Internal wiring (for inter-string connection	TaiCang JuRen PV Material CO.,Ltd.	Copper belt with tin plated	Width: 6.0mm Thickness: 0.4mm Sn63Pb37	Tested with PV modules
	TaiCang JuRen PV Material CO.,Ltd.	Copper belt with tin plated	Width: 4.0mm Thickness: 0.35mm Sn63Pb37	Tested with PV modules
	TaiCang JuRen PV Material CO.,Ltd.	Copper belt with tin plated	Width: 5.0mm Thickness: 0.4mm Sn63Pb37	Tested with PV modules
Fluxing agent	Singapore Asahi Chemical and Solder Industries Pte Ltd.	SF56	-	Tested with PV modules
Additional materials (fixing tape)	DONGGUAN XIONGFEI ELECTRONIC MATERIALS Co., Ltd	XF0530	Width = 5 mm	Tested with PV modules
	Hangzhou First PV Material Co., Ltd.	BEC-201	Thickness = 245µm	Tested with PV modules

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Buon Zhang
(Signature of authorized TÜV NORD CERT engineer)

PV-F-026 CDF Page 17 of 19 Version 1.2

File No.: PVP04006/21P-01 Attached to Test Report No.: 492011236.008

Object	Manufacturer	Type	Technical Data	Remark
	3M	UV-1	Thickness = 65µm±20um	Tested with PV modules
	CHANGZHOU BBETTER FILM TECHNOLOGIES CO., LTD	BIF 603	Thickness = 275um±15um	Tested with PV modules
Junction box set 1				
Junction box	QC Solar (Suzhou) Corporation	QC0816431	Rated voltage = 1500VDC Rated current = 16A Number of diodes: 3	Certificate no R 50353457
Adhesive (junction box)	SUZHOU TONSAN ADHESIVE CO., LTD.	TS1527	Color: white	-
Potting material	SUZHOU TONSAN ADHESIVE CO., LTD.	TS1521	Color: white	-
Bypass diodes	QC Solar (Suzhou) Corporation	SB3050DY	Tj max = 200°C Rated current = 30A	-
Cable	QC Solar (Suzhou) Corporation	H1Z2Z2-K 1x4.0mm²	Rated voltage = 1500VDC	Certificate no R 50348872
Connectors	QC Solar (Suzhou) Corporation	QC4.10-35	Rated voltage = 1500VDC Rated current = 41A	Certificate no R 50353779
Junction box set 2				
Junction box	QC Solar (Suzhou) Corporation	QC171721	Rated voltage = 1500VDC Rated current = 20A Number of diodes: 3	Certificate no R 50378787
Adhesive (junction box)	SUZHOU TONSAN ADHESIVE CO., LTD.	TS1527	Color: white	-
Potting material	SUZHOU TONSAN ADHESIVE CO., LTD.	TS1521	Color: white	-
Bypass diodes	QC Solar (Suzhou) Corporation	SB3050DY	Tj max = 200°C Rated current = 30A	-
Cable	QC Solar (Suzhou) Corporation	H1Z2Z2-K 1x4.0mm²	Rated voltage = 1500VDC	Certificate no R 50348872
Connectors	QC Solar (Suzhou) Corporation	QC4.10-35	Rated voltage = 1500VDC Rated current = 41A	Certificate no R 50353779
Junction box set 3				
Junction box	Changshu Friends Connector Technology Co., Ltd	F20-01	Rated voltage = 1500VDC Rated current = 20A Number of diodes: 3	Certificate no B 099272 0009 Rev.05
Adhesive (junction box)	SUZHOU TONSAN ADHESIVE CO.,LTD.	TS1527	Color: white	-
Potting material	SUZHOU TONSAN ADHESIVE CO.,LTD.	TS1521	Color: white	-
Bypass diodes	Changshu Friends Connector Technology Co., Ltd	FRD3045	Tj max = 200 °C Rated current = 30A	-

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Byan Zhang
(Signature of authorized TÜV NORD CERT engineer)

PV-F-026 CDF Page 18 of 19 Version 1.2

Object	Manufacturer	Type	Technical Data	Remark
Cable	Changshu Friends Connector Technology Co.,Ltd	H1Z2Z2-K 1x4.0mm²	Rated voltage = 1500VDC	Certificate no R 50421153
Connectors	Changshu Friends Connector Technology Co.,Ltd	PV5e	Rated voltage = 1500VDC Rated current = 30A	Certificate no B 170899272006
Junction box set 4				
Junction box	Jiangxi Jinko PV Material Co., Ltd.	PV-JK09Exy (x=M2 or L, y=1)	Rated voltage = 1500VDC Rated current = 20A Number of diodes: 3	Certificate no R 50354415
Adhesive (junction box)	SUZHOU TONSAN ADHESIVE CO.,LTD.	TS1527	Color: white	-
Potting material	SUZHOU TONSAN ADHESIVE CO.,LTD.	TS1521	Color: white	-
Bypass diodes	Jiangxi Jinko PV Material Co., Ltd.	TPA3045A	Tj max = 200°C Rated current= 30A	-
Cable	Jiangxi Jinko PV Material Co., Ltd.	H1Z2Z2-K 1x4.0mm²	Rated voltage = 1500VDC	Certificate no R 50319823
Connectors	Jiangxi Jinko PV Material Co., Ltd.	PV-JK03M/2B / PV-JK03M2/2B	Rated voltage = 1500VDC Rated current = 45A	Certificate no R 50318165
Junction box set 5				
Junction box	Changshu Friends Connector Technology Co., Ltd.	F20-01 002	Rated voltage = 1500VDC Rated current = 25A Number of diodes: 3	Certificate no B 099272 0009 Rev.05
Adhesive (junction box)	SUZHOU TONSAN ADHESIVE CO.,LTD.	TS1527	Color: white	-
Potting material	SUZHOU TONSAN ADHESIVE CO.,LTD.	TS1521	Color: white	-
Bypass diodes	Yangzhou Yangjie Electronic Technology Co., Ltd.	GFMK6045C	Tj max = 200 °C Rated current =60A	-
Cable	Changshu Friends Connector Technology Co., Ltd.	H1Z2Z2-K 1x4.0mm²	Rated voltage = 1500VDC	Certificate no R 50421153
Connectors	Changshu Friends Connector Technology Co., Ltd.	PV5e	Rated voltage = 1500VDC Rated current = 30A	Certificate no B 170899272006

Remark:

(1) Fire test Class C (MST 23 of IEC 61730-2: 2016) has been evaluated on all the raw materials listed above.

(2) Pollution degree I (Sequence B1 of IEC 61730-2:2016) has been evaluated on all the raw materials listed above.

(3) Those materials marked in blue are added in most recent project.

--------- End of CDF ---------

Confirmation of the applicant
Hefei, 08/16/2021 (Place and date)

(Applicant's legally authorized signature and stamp)

Confirmation of TÜV NORD CERT
Shanghai, 08/17/2021 (Place and date)

Ryan Zhang
(Signature of authorized TÜV NORD CERT engineer)

Annex 2: List of measurement equipment

Measurement / testing	Measuring equipment	Equipment ID	Calibration due date
Visual inspection	Luminometer	OI20-02	03/30/2022
Maximum power determination	Pulsed Solar Simulator	EV20-51	06/07/2022
Insulation test	Withstanding voltage/Insulation resistance tester	EV21-56	08/30/2021
Wet leakage current test	Withstanding voltage/ Insulation resistance tester	EV21-57	08/30/2021
	Conductive meter	CC20-01	03/31/2022
	Contact Thermometer	TT20-12	02/04/2022
	Wet leakage current test cistern	ES21-463	-
Static mechanical load test	Mechanical load tester	FP21-07	07/30/2021
Bypass diode functionality test	Pulsed Solar Simulator	EV20-51	06/07/2022
Initial stabilization	PV Module Test System	ES21-267	03/31/2022
Accessibility test	Multimeter	EV20-19	09/29/2021
	Test figer	ES21-39	07/23/2021
Continuity test of equipotential bonding	DC Power Supply	ES21-501	07/30/2021
	Multimeter	EV20-19	09/29/2021
Module breakage test	Impact tester	ES21-129	03/30/2022
Durability of markings	Chronograph	HT20-03	03/03/2022
Sharp edge test	Sharp edge tester	ES02-56	03/31/2022
	Cusp tester	ES02-57	03/31/2022
Others	Temperature -hydrometer	TT21-44 TT21-45 TT21-47	04/27/2022
	Steel Tape	LS21-05	07/23/2021
	Vernier caliper	LS20-04	07/23/2021

Annex 3: Statement of the estimated uncertainty of the test results

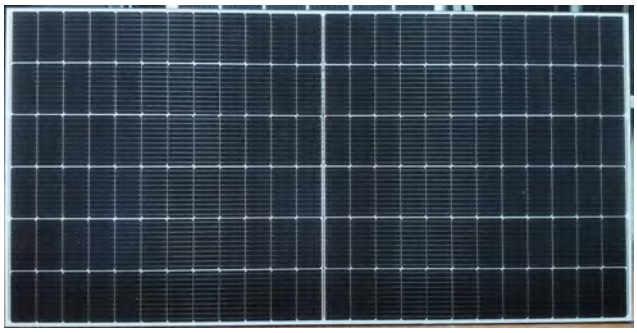
The total measuring uncertainty of Pmpp is ≤ 2.5%

The total measuring uncertainty of Isc is ≤ 2.3%

The total measuring uncertainty of Voc is ≤ 0.8%

Annex 4: Photos

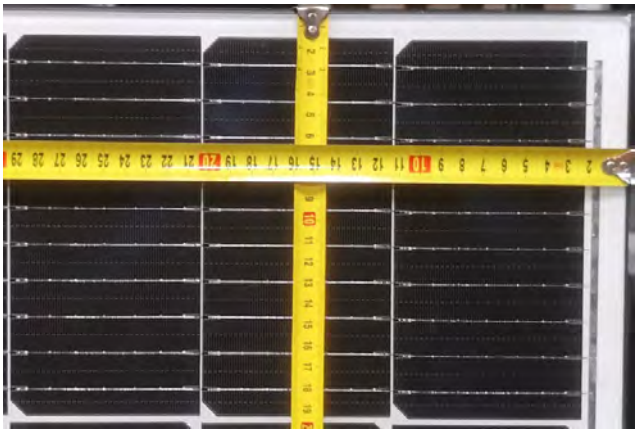
Module type: DHM-72X10FS-535W



Front overview

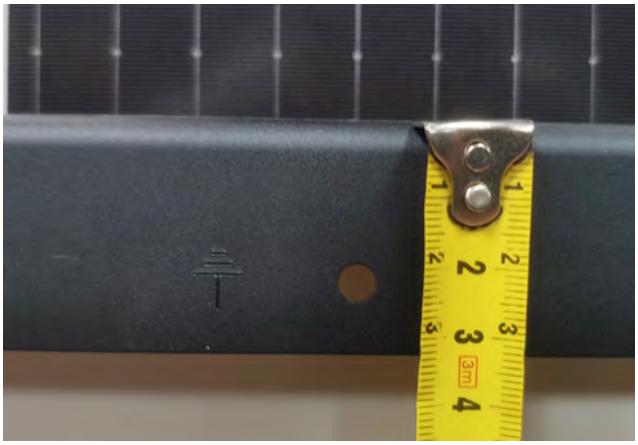
Back overview

Label



Solar cell

Frame

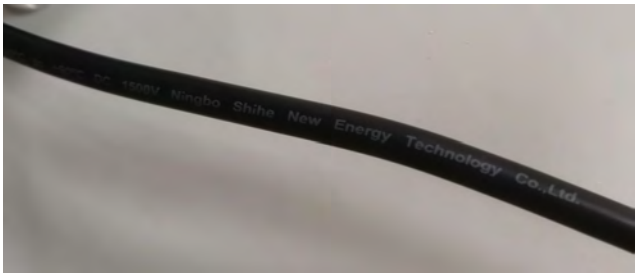


Grounding Mark

Junction box (PV-LMR800)

Junction box (opened)

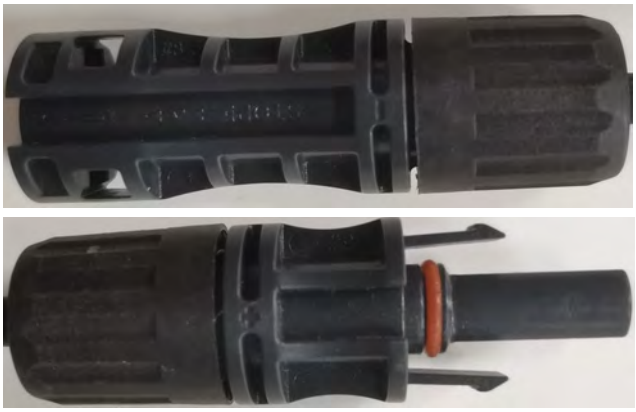
N/A



Bypass diode (Junction box is potted)

Cable (H1Z2Z2-K 1x4.0mm²)

Mark (Do not disconnect under load)



Connectors (#8-5)

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