Product Service

**Technical Report No. 704062504926-00**
**Dated 2025-05-27**

Client:

LONGi Green Energy Technology Co.,Ltd.
No.388, Middle Hangtian Road Chang'an District 710100
Xi'an City,Shaanxi PEOPLE'S REPUBLIC OF CHINA.
Customer No.: 099333

Manufacturing place:

a. LONGi Photovoltaic Technology (Taizhou) Co., Ltd. (Production facility No. in certificate: 99605)
No.8, Taikang Road Hailing District 225300 Taizhou City, Jiangsu Province PEOPLE'S REPUBLIC OF CHINA.

b. LONGi Solar Technology (Zhejiang) Co., Ltd. (Production facility No. in certificate: 99626)
2 Middle Bailing Road, Donggang Industrial Park, Economic Development Zone, 324000, Quzhou, Zhejiang,
P.R. China.
c. LONGi Solar Technology Co., Ltd. (Xi' an Module Factory) (Production facility No. in certificate: 02875)
No.8369 Shangyuan Road, Caotan Ecological Industrial Park, Economic and Technological Development
Zone, 710018 Xi'an, Shaanxi PEOPLE'S REPUBLIC OF CHINA.
d. LONGi Solar Technology (Chuzhou) Co., Ltd.Production Facility Code: 102892
No. 19 Huaian Road Nanqiao District 239000 Chuzhou City, Anhui Province PEOPLE'S REPUBLIC OF CHINA.
e. LONGi Solar Technology (Jiangsu) Co., Ltd. (Production Facility Code: 108647)
No. 288 Yaojia Road, Jiulong Town, Hailing District 225300 Taizhou City, Jiangsu Province PEOPLE'S REPUBLIC OF CHINA.
f. LONGi Solar Technology (Xianyang) Co., Ltd. (Production Facility Code: 108363)
No. 120, Wenxing West Road Qindu Distrct 712000 Xianyang City, Shaanxi Province PEOPLE'S REPUBLIC
OF CHINA.
g. LONGi Solar Technology (Jiaxing) Co., Ltd. (Production facility No. in certificate: 110068)
No.130 Ruifeng Street, Gaozhao Subdistrict, Xiuzhou District, 314031 Jiaxing City, Zhejiang Province, PEOPLE'S REPUBLIC OF CHINA.
h. LONGi Solar Technology (Xi'an) Co., Ltd. (Production Facility Code: 114737)
No. 388,Middle Hangtian Road, Chang'an District, 710100, Xi'an city, Shaanxi, P.R. China.

i. LONGi Photovoltaic Technology (Jiaxing) Co.,Ltd. (Production Facility Code: 119607)
No. 855 Zhongxin Road, Wangdian Town, Xiuzhou District, Jiaxing City, 314000, Zhejiang Province, P.R. China.

j. Illuminate USA LLC(Production Facility Code: 122119)
3600 Etna Parkway Pataskala, Ohio 43062.

Doc No.: ITC-TTW0902.02E- Rev. 17

k. LONGi Solar Technology (Wuhu) Co., Ltd. (Production Facility Code: 120099)
North of Wanxing Road and West of Yudai Road, Shenxiang Area,241000, Wuhu City, Anhui Province, People's Republic of China.

l. LONGi MALAYSIA SDN.BHD (Production Facility Code: 123171)
Persiaran Aeronautik,Presint 5A,Bandar Industri Bernilai Tinggi, Serendah,48200 Rawang, Selangor, MALAYSIA.
m. LONGi Photoelectric Technology (Jiaxing)Co.,Ltd.(Production Facility Code: 123508)
No.435 Changfan Road, Jiaxing Economic and Technological Development Zone 314001 Jiaxing Zhejiang Province, P.R. China.
n. LONGi Solar Technology (Chuzhou) Co., Ltd.Production Facility Code: 124148)
No. 18 Huizhou Road, Chuzhou City, Anhui Province,P.R.China.

o. LONGi Photovoltaic Technology (Ordos) Co., LTD. (Production Facility Code: 126931)
No.1 Jingyi Road, West Zone, Zero Carbon Industrial Park, Mengsu Economic Development Zone, Ejin Horo Banner, Ordos City, Inner Mongolia Autonomous Region.

p. LONGi Photovoltaic Technology (Heshan) Co., LTD.( Production Facility Code: 126896)
No. 77 Yiyuan Road,Jushan Town,Heshan City,Guangdong Province, P.R.China.

q. Funing GCL System (Factory number: 105673)
Funing Economic Development Zone, 224400, Yancheng City, Jiangsu Province, People's Republic of China.

r. Zhejiang Aiko Solar Technology Co.,Ltd. (125305)
No.888 Longqi Road, Suxi Town, 322009, Yiwu City, Zhejiang Province, P.R.China.

s. Zhuhai Fushan Aiko Solar Technology Co., Ltd. (123181)
No.681, Fuguo Road, Doumen District,Zhuhai 519175 Guangdong, P.R.China.

t. IC Star Solar LLC ( 130968 )
19200 Hamish Road, Tomball TX, 77377 USA.

Test subject: Model type:
LR7-54HJBB-485M,LR7-54HJBB-480M
LR7-72HJD-645M,LR7-72HJD-655M,LR7-72HJD-650M.

Test specification: IEC 61215-2:2021, visual inspection (MQT 01)
IEC 61215-2:2021, performance at STC (MQT 06)
IEC 61215-2:2021, Insulation test (MQT 03)
IEC 61215-2:2021, Wet leakage current (MQT 15)
IEC 61215-2:2021, Hail test (MQT 17)

| | |
|---|---|
| | According to client requirements |
| Purpose of examination: | The present test results show in clause 3 |

Test result:

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Doc No.: ITC-TTW0902.02E- Rev. 17

# 1 Description of the test subject

## 1.1 Function

Manufacturer's specification for intended use:
The PV modules for electricity generation systems with max. voltage of 1500V DC.

## 1.2 Consideration of the foreseeable misuse

*(Regulated by law, e.g. GPSG, MDD, therefore always applicable)*

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

## 1.3 Technical Data (minimum Rating plate)

| Sam-ple No. | Model serial No. | Model type | Remark |
|---|---|---|---|
| 1# | LRR010160250204400019 | LR7-54HJBB-485M | Controls |
| 2# | LRR010160250204400010 | LR7-54HJBB-480M | 2.0mm thickness AR Coating Heat Strengthened Glass+1.6mm thick-ness Heat Strengthened Glass with black gridding mask, φ35mm,∠0°. |
| 3# | LRR010160250204400014 | LR7-54HJBB-485M | |
| 4# | LRR010160250204400018 | LR7-54HJBB-485M | 2.0mm thickness AR Coating Heat Strengthened Glass+1.6mm Thickness Heat Strengthened Glass with black gridding mask, φ45mm,∠0°. |
| 5# | LRR010160250204400013 | LR7-54HJBB-480M | |
| 6# | LRR004160250204700022 | LR7-72HJD-655M | Controls |
| 7# | LRR004160250204700007 | LR7-72HJD-645M | 2.0mm thickness AR Coating Heat Strengthened Glass+2.0mm thick-ness Heat Strengthened Glass with white gridding mask, φ35mm,∠0°. |
| 8# | LRR004160250204700008 | LR7-72HJD-645M | |
| 9# | LRR004160250204700011 | LR7-72HJD-650M | 2.0mm thickness AR Coating Heat Strengthened Glass+2.0mm thick-ness Heat Strengthened Glass with white gridding mask, φ45mm,∠0°. |
| 10# | LRR004160250204700012 | LR7-72HJD-650M | |

# 2 Order

## 2.1 Date of Purchase Order, Customer's Reference

The order dated 2025-02-28

## 2.2 Receipt of Test Sample, Location

2025-03-24.

## 2.3 Date of Testing

2025-03-24 to 2025-04-02

## 2.4 Location of Testing

Zhejiang HJE Co.,LTd.
3-4/F,Building 1, No.3556, Linggongtang Road,Nanhu District, Jiaxing
Zhejiang,P.R.China.

## 2.5 Points of Non-compliance or Exceptions of the Test Procedure

- N/A

## 3. Test Results

### 3.1.Positive Test Results

| **3.1.1 TABLE 01: MQT 01 Initial Visual inspection** | | P |
|---|---|---|
| Test Date (YYYY-MM-DD) ..... : | 2025-03-24 | — |
| Sample # | Nature and position of initial findings – comments or attach photos | — |
| 1# | No major visual defects | P |
| 2# | No major visual defects | P |
| 3# | No major visual defects | P |
| 4# | No major visual defects | P |
| 5# | No major visual defects | P |
| 6# | No major visual defects | P |
| 7# | No major visual defects | P |
| 8# | No major visual defects | P |
| 9# | No major visual defects | P |
| 10# | No major visual defects | P |
| Supplementary information: N/A | | |

| **3.1.2 TABLE 02: MQT 02 Initial Maximun power determination** | | P |
|---|---|---|
| Test Date [YYYY-MM-DD]……..…..: | 2025-03-24 | — |
| Module temperature [°C]..... : | 25 | — |



Doc No.: ITC-TTW0902.02E- Rev. 17

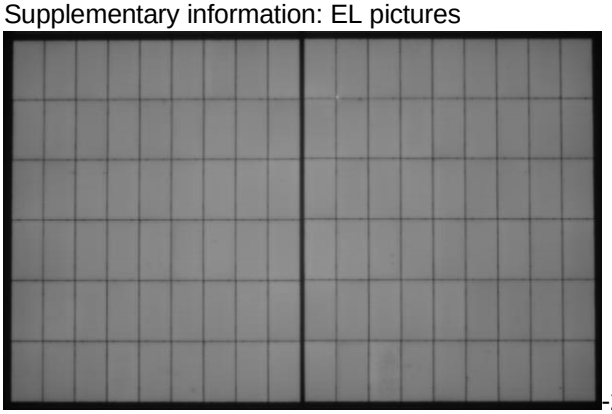
| Sample # | Irradiance [W/m$^2$] | Isc [A] | Voc [V] | Imp [A] | Vmp [V] | Pmp [W] | FF [%] |
|---|---|---|---|---|---|---|---|
| 1#FRONT | 1000 | 14.533 | 40.384 | 13.748 | 35.435 | 487.158 | 83.006 |
| 2#FRONT | 1000 | 14.568 | 40.287 | 13.640 | 35.341 | 482.034 | 82.132 |
| 3#FRONT | 1000 | 14.527 | 40.346 | 13.737 | 35.398 | 486.270 | 82.965 |
| 4#FRONT | 1000 | 14.506 | 40.344 | 13.724 | 35.401 | 485.827 | 83.016 |
| 5#FRONT | 1000 | 14.504 | 40.317 | 13.709 | 35.372 | 484.925 | 82.925 |
| 1#REAR | 1000 | 7.638 | 39.699 | 7.135 | 34.260 | 244.449 | 80.621 |
| 2#REAR | 1000 | 7.837 | 39.608 | 7.263 | 34.217 | 248.535 | 80.069 |
| 3#REAR | 1000 | 7.635 | 39.669 | 7.151 | 34.243 | 244.884 | 80.854 |
| 4#REAR | 1000 | 7.633 | 39.668 | 7.155 | 34.251 | 245.052 | 80.932 |
| 5#REAR | 1000 | 7.621 | 39.661 | 7.137 | 34.248 | 244.408 | 80.865 |
| 1#BNPI | 1068 | 15.516 | 40.453 | 14.815 | 35.200 | 521.477 | 83.084 |
| 2#BNPI | 1070 | 15.582 | 40.360 | 14.733 | 35.114 | 517.346 | 82.262 |
| 3#BNPI | 1071 | 15.556 | 40.417 | 14.845 | 35.170 | 522.079 | 83.038 |
| 4#BNPI | 1068 | 15.489 | 40.410 | 14.787 | 35.161 | 519.919 | 83.064 |
| 5#BNPI | 1068 | 15.509 | 40.411 | 14.807 | 35.007 | 518.352 | 82.704 |
| 6#FRONT | 1000 | 14.681 | 53.828 | 13.955 | 47.234 | 659.137 | 83.411 |
| 7#FRONT | 1000 | 14.685 | 53.757 | 13.836 | 46.927 | 649.297 | 82.252 |
| 8#FRONT | 1000 | 14.684 | 53.755 | 13.810 | 47.033 | 649.508 | 82.285 |
| 9#FRONT | 1000 | 14.663 | 53.816 | 13.882 | 47.227 | 655.627 | 83.087 |
| 10#FRONT | 1000 | 14.665 | 53.821 | 13.897 | 47.104 | 654.588 | 82.933 |
| 6#REAR | 1000 | 8.573 | 53.068 | 7.948 | 45.933 | 365.094 | 80.249 |
| 7#REAR | 1000 | 8.718 | 53.013 | 8.044 | 45.903 | 369.249 | 79.892 |
| 8#REAR | 1000 | 8.690 | 53.047 | 8.009 | 46.035 | 368.671 | 79.975 |
| 9#REAR | 1000 | 8.561 | 53.061 | 7.906 | 46.044 | 364.019 | 80.134 |
| 10#REAR | 1000 | 8.509 | 53.052 | 7.898 | 46.028 | 363.522 | 80.533 |
| 1#BNPI | 1075 | 15.775 | 53.930 | 15.467 | 45.909 | 710.050 | 83.463 |
| 2#BNPI | 1077 | 15.809 | 53.854 | 15.409 | 45.585 | 702.445 | 82.505 |
| 3#BNPI | 1077 | 15.817 | 53.861 | 15.388 | 45.713 | 703.414 | 82.569 |
| 4#BNPI | 1075 | 15.763 | 53.927 | 15.410 | 45.907 | 707.454 | 83.225 |
| 5#BNPI | 1075 | 15.757 | 53.922 | 15.416 | 45.769 | 705.582 | 83.041 |

Supplementary information: N/A

| 3.1.3 TABLE 03: Electroluminescence measurement (Intermediate) | | — |
|---|---|---|
| Test Date [YYYY-MM-DD] .....: | 2025-03-24 | — |
| Applied current [A]……...: | 14.5 | — |
| Exposure time [s] ……: | 2 | — |

| Sample No. | Nature and position of initial findings – comments or attach photos | Result |
|---|---|---|
| 2# | No major visual defects. | — |
| 3# | No major visual defects. | — |
| 4# | No major visual defects. | — |
| 5# | No major visual defects. | — |
| 7# | No major visual defects. | — |
| 8# | No major visual defects. | — |
| 9# | No major visual defects. | — |
| 10# | No major visual defects. | — |

Supplementary information: EL pictures



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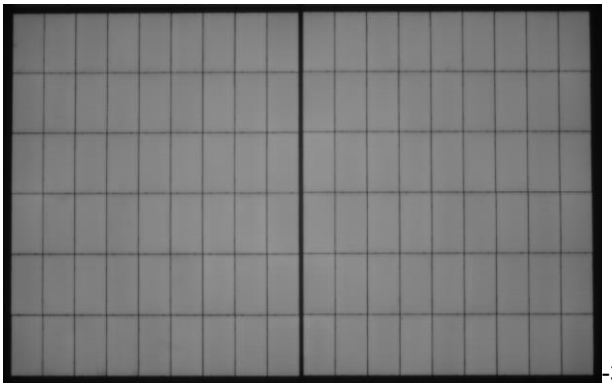
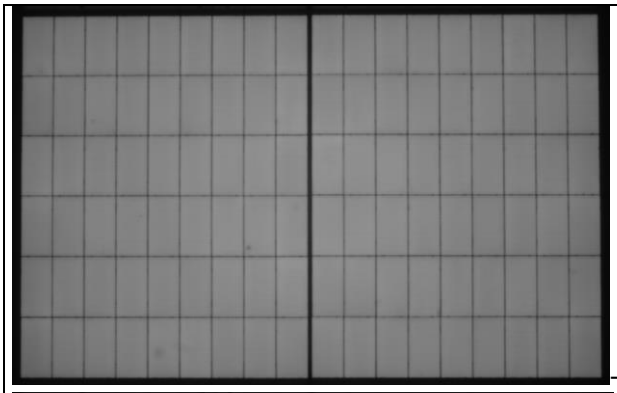


-3#

Doc No.: ITC-TTW0902.02E- Rev. 17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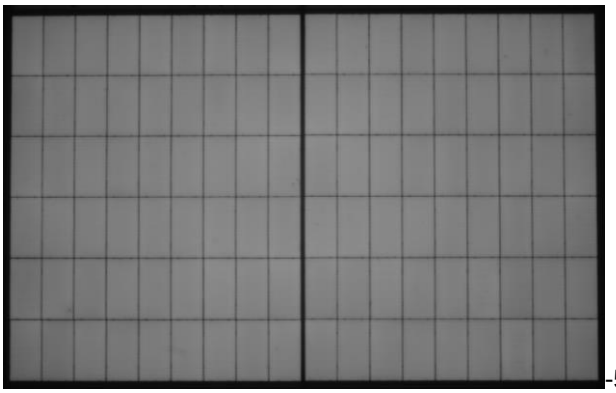
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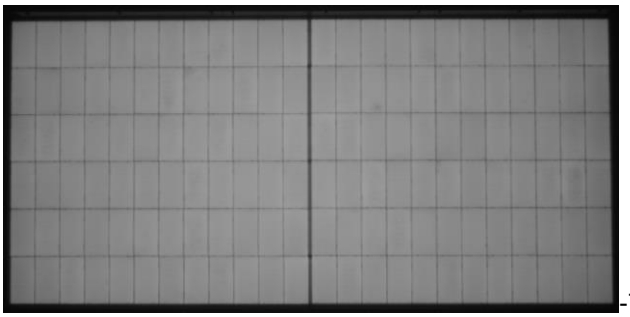
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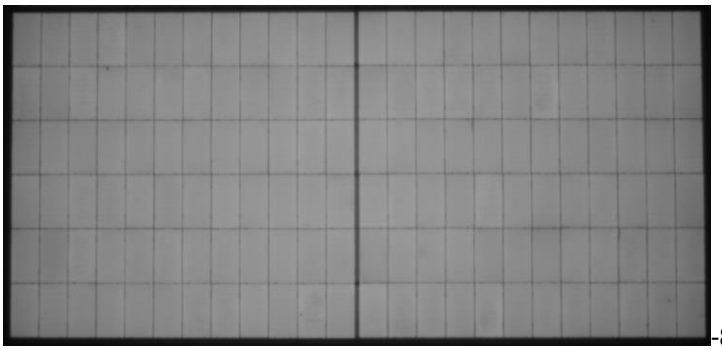
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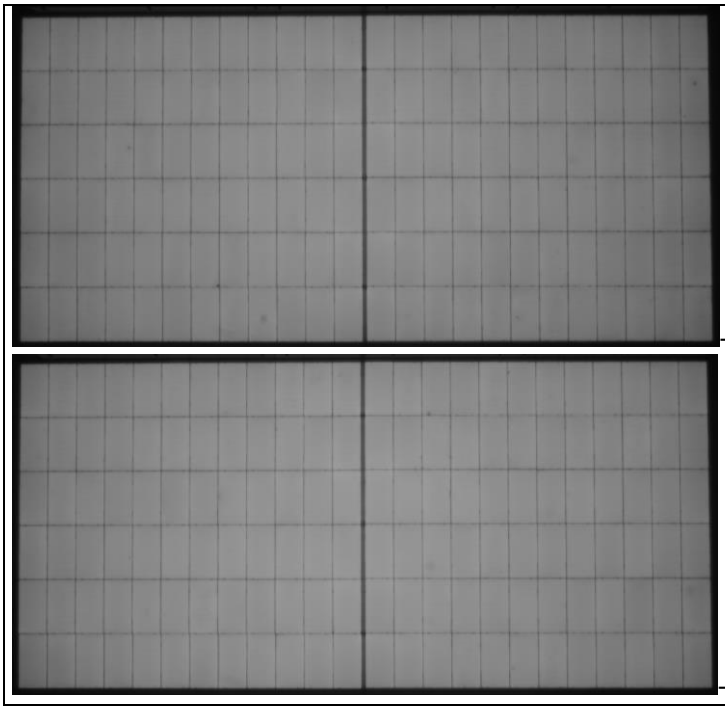
Doc No.: ITC-TTW0902.02E- Rev. 17


-9#

-10#

| 3.1.6 TABLE 06: MQT 03 Initial Insulation test | | | | P |
|---|---|---|---|---|
| Test Date [YYYY-MM-DD].....: | 2025-03-24 | | | — |
| Test Voltage applied [V] .....: | 8000/1500 | | | — |
| Size of module [m²].....: | 2.04 (sample 1-5)<br>2.70 (sample 7-10) | | | — |
| Required Resistance [MΩ] ..... : | 19.61/14.81 | | | — |
| Sample # | Measured | Dielectric breakdown | | Result |
| | MΩ | Yes (description) | No | |
| 2# | >10000 | — | x | P |
| 3# | >10000 | — | x | P |
| 4# | >10000 | — | x | P |
| 5# | >10000 | — | x | P |
| 7# | >10000 | — | x | P |
| 8# | >10000 | — | x | P |
| 9# | >10000 | — | x | P |
| 10# | >10000 | — | x | P |
| Supplementary information: The maximum resistance measurement range is 10000MΩ. | | | | |

| 3.1.7 TABLE 07: MQT 15 Initial Wet leakage current test | | | | P |
|---|---|---|---|---|
| Test Date [YYYY-MM-DD]..... : | | 2025-03-24 | | — |
| Test Voltage applied [V] ..... : | | 1500 | | — |
| Solution temperature [°C] ..... : | | 22.1 | | — |
| Solution resistivity [Ω cm] ..... : | | 2481 | | — |
| Size of module [m²]..... : | | 2.04(sample 1-5)<br>/2.70(sample 6-10) | | — |
| Sample # | Required Resistance [MΩ] | Measured [MΩ] | | Result |
| 2# | 19.61 | 7200 | | P |
| 3# | 19.61 | 7500 | | P |
| 4# | 19.61 | 8300 | | P |
| 5# | 19.61 | 7300 | | P |
| 7# | 14.81 | >10000 | | P |
| 8# | 14.81 | >10000 | | P |
| 9# | 14.81 | >10000 | | P |
| 10# | 14.81 | >10000 | | P |
| Supplementary information: The maximum resistance measurement range is 10000MΩ. | | | | |

| 3.1.8 TABLE 08: MQT 17 - Hail impact test | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Test Date [YYYY-MM-DD]..... : | 2025-03-31 | | | | | | — |
| Sample # | 2# | | | | | | — |
| Ice ball size [mm] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 34.79 | 34.66 | 34.58 | 34.38 | 34.26 | 34.71 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 34.33 | 34.50 | 34.86 | 34.55 | 34.19 | | |
| Ice ball weight [g] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 20.08 | 20.17 | 20.13 | 20.23 | 20.19 | 20.54 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 20.32 | 20.64 | 20.81 | 20.65 | 20.27 | | |
| Ice ball velocity [m/s]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 26.91 | 26.77 | 26.69 | 26.75 | 26.64 | 26.69 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 26.53 | 26.62 | 26.51 | 26.58 | 26.86 | | |
| Number of impact locations ..... : | 11 | | | | | | — |

Supplementary information: (impact location descriptions)

| Shot No. | Location |
|---|---|
| 1 | Any corner of the module window, not more than one radius of ice-ball from the module edge. |
| 2 | Any edge of the module, not more than one radius of ice-ball from the module edge. |
| 3, 4 | Over the circuit near interconnects (i.e. cell interconnects and bus ribbons). |
| 5, 6 | Over edges of the circuit (e.g. individual cells). |
| 7, 8 | On the module window, not more than half diameter of ice ball from one of the points at which the module is mounted to the supporting structure. |
| 9, 10 | On the module window, at points farthest from the points selected above. |
| 11 | Over the junction box. |

| **3.1.9 TABLE 09: MQT 17 - Hail impact test** | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Test Date [YYYY-MM-DD]..... : | 2025-03-31 | | | | | | — |
| Sample # | 3# | | | | | | — |
| Ice ball size [mm] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 35.07 | 34.68 | 34.82 | 34.93 | 35.13 | 35.28 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 35.64 | 34.67 | 35.02 | 35.16 | 35.33 | | |
| Ice ball weight [g] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 20.81 | 20.23 | 20.46 | 20.62 | 20.93 | 20.87 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 21.27 | 20.35 | 20.76 | 20.85 | 21.08 | | |
| Ice ball velocity [m/s]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 26.90 | 26.87 | 26.83 | 26.91 | 26.95 | 26.89 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 27.03 | 26.76 | 26.92 | 26.88 | 26.98 | | |
| Number of impact locations ..... : | 11 | | | | | | — |

Supplementary information: (impact location descriptions)

| Shot No. | Location |
|---|---|
| 1 | Any corner of the module window, not more than one radius of ice-ball from the module edge. |
| 2 | Any edge of the module, not more than one radius of ice-ball from the module edge. |
| 3, 4 | Over the circuit near interconnects (i.e. cell interconnects and bus ribbons). |

| | |
|---|---|
| 5, 6 | Over edges of the circuit (e.g. individual cells). |
| 7, 8 | On the module window, not more than half diameter of ice ball from one of the points at which the module is mounted to the supporting structure. |
| 9, 10 | On the module window, at points farthest from the points selected above. |
| 11 | Over the junction box. |

| **3.1.10 TABLE 10: MQT 17 - Hail impact test** | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Test Date [YYYY-MM-DD]..... : | 2025-04-01 | | | | | | — |
| Sample # | 4# | | | | | | — |
| Ice ball size [mm] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 45.07 | 45.11 | 45.24 | 45.37 | 44.92 | 44.83 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 45.19 | 44.67 | 45.23 | 45.33 | 44.58 | | |
| Ice ball weight [g] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 44.19 | 44.23 | 44.16 | 44.32 | 43.85 | 43.87 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 44.22 | 43.68 | 44.45 | 44.26 | 43.72 | | |
| Ice ball velocity [m/s]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 30.82 | 30.87 | 30.78 | 30.90 | 30.83 | 30.77 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 30.91 | 30.75 | 30.93 | 30.88 | 30.70 | | |
| Number of impact locations ..... : | 11 | | | | | | — |

Supplementary information: (impact location descriptions)

| Shot No. | Location |
|---|---|
| 1 | Any corner of the module window, not more than one radius of ice-ball from the module edge. |
| 2 | Any edge of the module, not more than one radius of ice-ball from the module edge. |
| 3, 4 | Over the circuit near interconnects (i.e. cell interconnects and bus ribbons). |
| 5, 6 | Over edges of the circuit (e.g. individual cells). |
| 7, 8 | On the module window, not more than half diameter of ice ball from one of the points at which the module is mounted to the supporting structure. |
| 9, 10 | On the module window, at points farthest from the points selected above. |
| 11 | Over the junction box. |

| 3.1.11 TABLE 11: MQT 17 - Hail impact test | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Test Date [YYYY-MM-DD]..... : | 2025-04-01 | | | | | | — |
| Sample # | 5# | | | | | | — |
| Ice ball size [mm]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 45.33 | 44.81 | 45.02 | 45.18 | 45.06 | 45.27 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 44.49 | 44.92 | 44.62 | 44.58 | 44.88 | | |
| Ice ball weight [g]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 44.22 | 43.90 | 44.04 | 44.09 | 43.96 | 44.19 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 43.86 | 43.91 | 43.76 | 43.69 | 43.86 | | |
| Ice ball velocity [m/s]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 30.80 | 30.72 | 30.76 | 30.85 | 30.76 | 30.82 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 30.89 | 30.83 | 30.87 | 30.80 | 30.77 | | |
| Number of impact locations..... : | 11 | | | | | | — |

Supplementary information: (impact location descriptions)

| Shot No. | Location |
|---|---|
| 1 | Any corner of the module window, not more than one radius of ice-ball from the module edge. |
| 2 | Any edge of the module, not more than one radius of ice-ball from the module edge. |
| 3, 4 | Over the circuit near interconnects (i.e. cell interconnects and bus ribbons). |
| 5, 6 | Over edges of the circuit (e.g. individual cells). |
| 7, 8 | On the module window, not more than half diameter of ice ball from one of the points at which the module is mounted to the supporting structure. |
| 9, 10 | On the module window, at points farthest from the points selected above. |
| 11 | Over the junction box. |

| 3.1.12 TABLE 08: MQT 17 - Hail impact test | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Test Date [YYYY-MM-DD]..... : | 2025-03-25 | | | | | | — |
| Sample # | 7# | | | | | | — |
| Ice ball size [mm]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 34.66 | 34.82 | 34.85 | 34.22 | 34.94 | 35.01 | |
| | 7 | 8 | 9 | 10 | 11 | | |

Doc No.: ITC-TTW0902.02E- Rev. 17

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 34.76 | 35.17 | 34.59 | 34.68 | 35.23 | | |
| Ice ball weight [g] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 20.62 | 20.68 | 20.73 | 20.42 | 20.77 | 20.86 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 20.84 | 21.07 | 20.64 | 20.72 | 21.26 | | |
| Ice ball velocity [m/s]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 26.74 | 26.68 | 26.71 | 26.86 | 26.83 | 26.72 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 26.91 | 26.73 | 26.67 | 26.77 | 26.90 | | |
| Number of impact locations ..... : | 11 | | | | | | — |

Supplementary information: (impact location descriptions)

| Shot No. | Location |
|---|---|
| 1 | Any corner of the module window, not more than one radius of ice-ball from the module edge. |
| 2 | Any edge of the module, not more than one radius of ice-ball from the module edge. |
| 3, 4 | Over the circuit near interconnects (i.e. cell interconnects and bus ribbons). |
| 5, 6 | Over edges of the circuit (e.g. individual cells). |
| 7, 8 | On the module window, not more than half diameter of ice ball from one of the points at which the module is mounted to the supporting structure. |
| 9, 10 | On the module window, at points farthest from the points selected above. |
| 11 | Over the junction box. |

| **3.1.13 TABLE 09: MQT 17 - Hail impact test** | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Test Date [YYYY-MM-DD]..... : | 2025-03-25 | | | | | | — |
| Sample # | 8# | | | | | | — |
| Ice ball size [mm] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 34.96 | 35.17 | 34.92 | 35.05 | 34.74 | 35.11 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 35.03 | 34.87 | 34.86 | 35.01 | 34.93 | | |
| Ice ball weight [g] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 20.74 | 20.95 | 20.82 | 20.86 | 20.85 | 21.01 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 20.98 | 20.72 | 20.75 | 20.97 | 20.92 | | |
| Ice ball velocity [m/s]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |

Doc No.: ITC-TTW0902.02E- Rev. 17

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 26.94 | 26.91 | 26.88 | 26.87 | 26.86 | 26.93 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 26.86 | 26.91 | 26.85 | 26.93 | 26.85 | | |
| Number of impact locations ..... : | 11 | | | | | | — |

Supplementary information: (impact location descriptions)

| Shot No. | Location |
|---|---|
| 1 | Any corner of the module window, not more than one radius of ice-ball from the module edge. |
| 2 | Any edge of the module, not more than one radius of ice-ball from the module edge. |
| 3, 4 | Over the circuit near interconnects (i.e. cell interconnects and bus ribbons). |
| 5, 6 | Over edges of the circuit (e.g. individual cells). |
| 7, 8 | On the module window, not more than half diameter of ice ball from one of the points at which the module is mounted to the supporting structure. |
| 9, 10 | On the module window, at points farthest from the points selected above. |
| 11 | Over the junction box. |

| **3.1.14 TABLE 10: MQT 17 - Hail impact test** | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Test Date [YYYY-MM-DD]..... : | 2025-03-26 | | | | | | — |
| Sample # | 9# | | | | | | — |
| Ice ball size [mm] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 44.79 | 44.98 | 44.85 | 45.11 | 45.06 | 44.78 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 44.86 | 44.52 | 44.79 | 45.07 | 45.18 | | |
| Ice ball weight [g] ..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 43.65 | 43.39 | 43.56 | 43.72 | 43.68 | 44.24 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 44.13 | 43.79 | 43.83 | 43.67 | 43.88 | | |
| Ice ball velocity [m/s]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 30.66 | 30.74 | 30.73 | 30.85 | 30.67 | 30.81 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 30.83 | 30.62 | 30.71 | 30.86 | 30.54 | | |
| Number of impact locations ..... : | 11 | | | | | | — |

Supplementary information: (impact location descriptions)

| Shot No. | Location |
|---|---|

Doc No.: ITC-TTW0902.02E- Rev. 17

| | |
|---|---|
| 1 | Any corner of the module window, not more than one radius of ice-ball from the module edge. |
| 2 | Any edge of the module, not more than one radius of ice-ball from the module edge. |
| 3, 4 | Over the circuit near interconnects (i.e. cell interconnects and bus ribbons). |
| 5, 6 | Over edges of the circuit (e.g. individual cells). |
| 7, 8 | On the module window, not more than half diameter of ice ball from one of the points at which the module is mounted to the supporting structure. |
| 9, 10 | On the module window, at points farthest from the points selected above. |
| 11 | Over the junction box. |

| **3.1.15 TABLE 11: MQT 17 - Hail impact test** | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Test Date [YYYY-MM-DD]..... : | 2025-03-26 | | | | | | — |
| Sample # | 10# | | | | | | — |
| Ice ball size [mm]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 45.17 | 45.26 | 45.33 | 44.95 | 44.88 | 44.87 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 44.96 | 44.79 | 44.83 | 45.07 | 44.69 | | |
| Ice ball weight [g]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 44.16 | 44.13 | 44.32 | 44.01 | 44.12 | 43.95 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 44.11 | 43.96 | 43.85 | 44.15 | 43.88 | | |
| Ice ball velocity [m/s]..... : | 1 | 2 | 3 | 4 | 5 | 6 | — |
| | 30.91 | 30.86 | 30.87 | 30.79 | 30.70 | 30.73 | |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 30.82 | 30.75 | 30.79 | 30.83 | 30.72 | | |
| Number of impact locations..... : | 11 | | | | | | — |

Supplementary information: (impact location descriptions)

| Shot No. | Location |
|---|---|
| 1 | Any corner of the module window, not more than one radius of ice-ball from the module edge. |
| 2 | Any edge of the module, not more than one radius of ice-ball from the module edge. |
| 3, 4 | Over the circuit near interconnects (i.e. cell interconnects and bus ribbons). |
| 5, 6 | Over edges of the circuit (e.g. individual cells). |
| 7, 8 | On the module window, not more than half diameter of ice ball from one of the points at which the module is mounted to the supporting structure. |

| | |
|---|---|
| 9, 10 | On the module window, at points farthest from the points selected above. |
| 11 | Over the junction box. |

| **3.1.16 TABLE 16: MQT 01 Visual inspection (Final)** | | P |
|---|---|---|
| Test Date (YYYY-MM-DD) ..... : | 2025-04-02 | — |
| Sample # | Nature and position of initial findings – comments or attach photos | — |
| 2# | No major visual defects | P |
| 3# | No major visual defects | P |
| 4# | No major visual defects | P |
| 5# | No major visual defects | P |
| 7# | No major visual defects | P |
| 8# | No major visual defects | P |
| 9# | No major visual defects | P |
| 10# | No major visual defects | P |
| Supplementary information: N/A | | |

| **3.1.17 TABLE 17: MQT 02 Maximun power determination (Final)** | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Test Date [YYYY-MM-DD]……..:: | | | 2025-04-02 | | | | — |
| Module temperature [°C]..... : | | | 25 | | | | — |
| Sample # | Irradiance [W/m$^2$] | Isc [A] | Voc [V] | Imp [A] | Vmp [V] | Pmp [W] | FF [%] |
| 1#FRONT | 1000 | 14.524 | 40.350 | 13.765 | 35.265 | 485.416 | 82.831 |
| 2#FRONT | 1000 | 14.561 | 40.288 | 13.755 | 35.029 | 481.814 | 82.131 |
| 3#FRONT | 1000 | 14.524 | 40.354 | 13.747 | 35.349 | 485.932 | 82.912 |
| 4#FRONT | 1000 | 14.491 | 40.347 | 13.738 | 35.344 | 485.549 | 83.045 |
| 5#FRONT | 1000 | 14.500 | 40.320 | 13.724 | 35.300 | 484.449 | 82.866 |
| 1#REAR | 1000 | 7.621 | 39.652 | 7.140 | 34.159 | 243.884 | 80.705 |
| 2#REAR | 1000 | 7.833 | 39.617 | 7.203 | 34.477 | 248.331 | 80.027 |
| 3#REAR | 1000 | 7.635 | 39.663 | 7.091 | 34.519 | 244.763 | 80.828 |
| 4#REAR | 1000 | 7.618 | 39.674 | 7.141 | 34.294 | 244.898 | 81.023 |
| 5#REAR | 1000 | 7.620 | 39.666 | 7.134 | 34.226 | 244.183 | 80.788 |
| 1#BNPI | 1068 | 15.516 | 40.411 | 14.826 | 34.979 | 518.598 | 82.710 |
| 2#BNPI | 1070 | 15.578 | 40.364 | 14.699 | 35.178 | 517.063 | 82.231 |

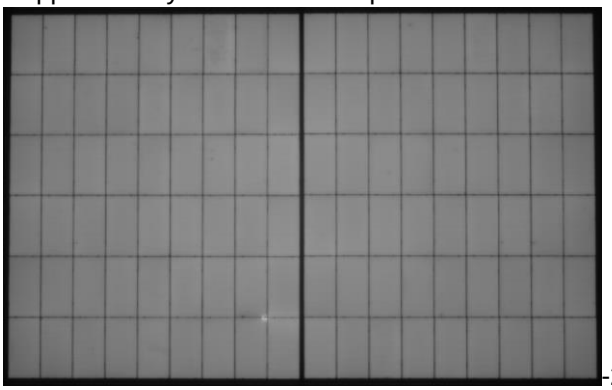
Doc No.: ITC-TTW0902.02E- Rev. 17

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3#BNPI | 1068 | 15.541 | 40.432 | 14.843 | 35.108 | 521.125 | 82.936 |
| 4#BNPI | 1068 | 15.470 | 40.419 | 14.642 | 35.461 | 519.229 | 83.037 |
| 5#BNPI | 1068 | 15.486 | 40.389 | 14.630 | 35.386 | 517.708 | 82.772 |
| 6#FRONT | 1000 | 14.688 | 53.717 | 13.998 | 46.994 | 657.843 | 83.380 |
| 7#FRONT | 1000 | 14.675 | 53.736 | 13.877 | 46.761 | 648.916 | 82.291 |
| 8#FRONT | 1000 | 14.676 | 53.732 | 13.875 | 46.779 | 649.055 | 82.310 |
| 9#FRONT | 1000 | 14.651 | 53.791 | 13.925 | 47.063 | 655.342 | 83.156 |
| 10#FRONT | 1000 | 14.655 | 53.820 | 13.964 | 46.850 | 654.204 | 82.944 |
| 6#REAR | 1000 | 8.600 | 52.966 | 7.986 | 45.665 | 364.662 | 80.054 |
| 7#REAR | 1000 | 8.700 | 52.973 | 8.030 | 45.969 | 369.135 | 80.098 |
| 8#REAR | 1000 | 8.695 | 53.024 | 8.037 | 45.838 | 368.378 | 79.898 |
| 9#REAR | 1000 | 8.555 | 53.073 | 7.907 | 46.003 | 363.741 | 80.116 |
| 10#REAR | 1000 | 8.490 | 53.001 | 7.885 | 46.071 | 363.285 | 80.730 |
| 6#BNPI | 1075 | 15.787 | 53.813 | 15.491 | 45.630 | 706.865 | 83.205 |
| 7#BNPI | 1077 | 15.797 | 53.839 | 15.084 | 46.543 | 702.061 | 82.548 |
| 8#BNPI | 1077 | 15.800 | 53.862 | 14.922 | 47.083 | 702.573 | 82.558 |
| 9#BNPI | 1075 | 15.747 | 53.894 | 14.957 | 47.241 | 706.558 | 83.252 |
| 10#BNPI | 1075 | 15.751 | 53.925 | 15.447 | 45.609 | 704.509 | 82.946 |
| Supplementary information: N/A | | | | | | | |

| **3.1.18 TABLE 18: Electroluminescence measurement (Final)** | | — |
|---|---|---|
| Test Date [YYYY-MM-DD] .....: | 2025-04-02 | — |
| Applied current [A]……...: | 14.5 | — |
| Exposure time [s] ……: | 2 | — |

| Sample No. | Nature and position of initial findings – comments or attach photos | Result |
|---|---|---|
| 2# | No major visual defects. | — |
| 3# | No major visual defects. | — |
| 4# | No major visual defects. | — |
| 5# | No major visual defects. | — |
| 7# | No major visual defects. | — |
| 8# | No major visual defects. | — |
| 9# | No major visual defects. | — |
| 10# | No major visual defects. | — |

Supplementary information: EL pictures



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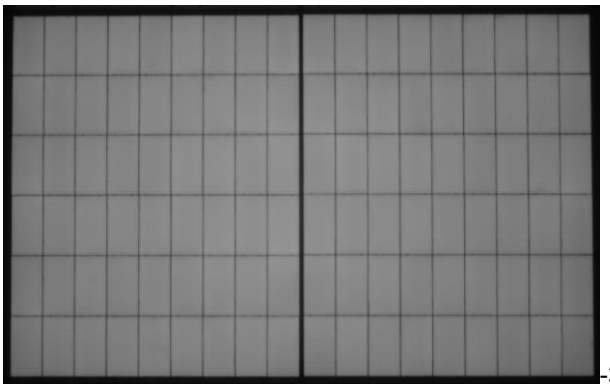

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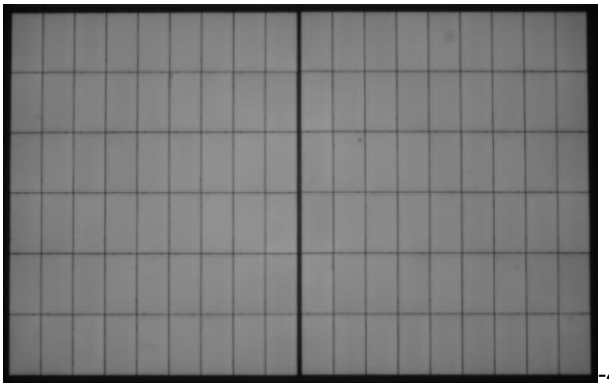

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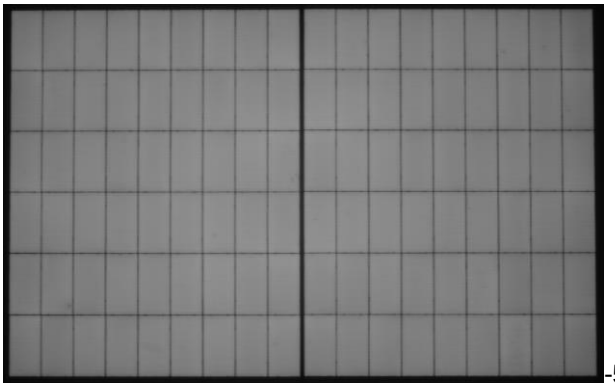

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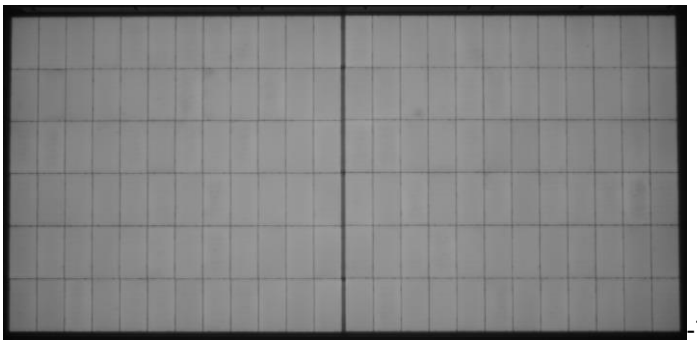

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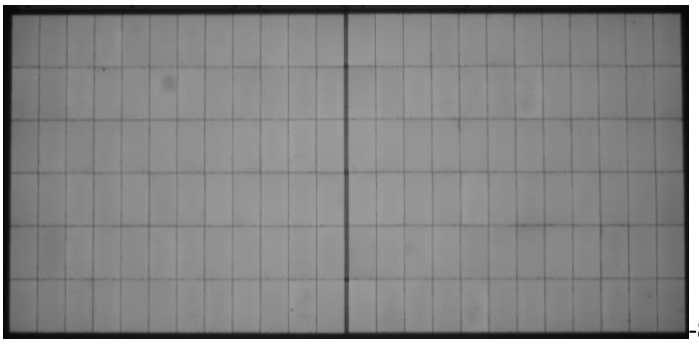

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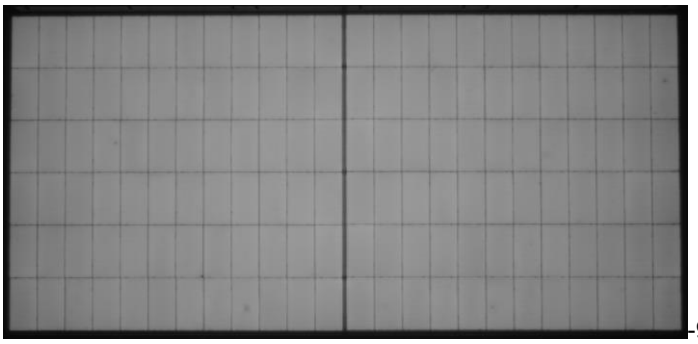

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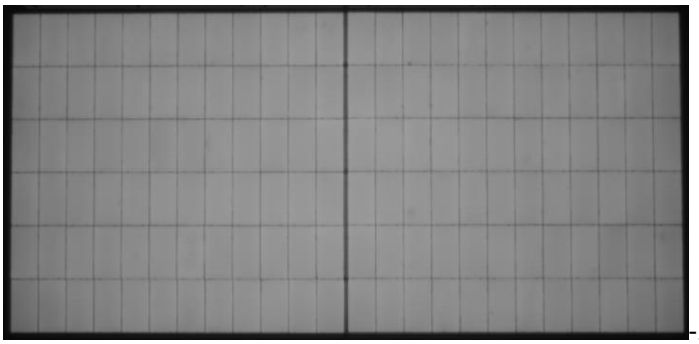


-10#

Doc No.: ITC-TTW0902.02E- Rev. 17

| 3.1.19 TABLE 19: MQT 03 Insulation test (Final) | | | | P |
|---|---|---|---|---|
| Test Date [YYYY-MM-DD].....: | 2025-04-02 | | | — |
| Test Voltage applied [V] .....: | 8000/1500 | | | — |
| Size of module [m²].....: | 2.04 (sample 1-5)<br>2.70 (sample 6-10) | | | — |
| Required Resistance [MΩ] ..... : | 19.61 (sample 1-5)/<br>14.81 (sample 6-10) | | | — |
| Sample # | Measured | Dielectric breakdown | | Result |
| | MΩ | Yes (description) | No | |
| 2# | >10000 | — | x | P |
| 3# | >10000 | — | x | P |
| 4# | >10000 | — | x | P |
| 5# | >10000 | — | x | P |
| 7# | >10000 | — | x | P |
| 8# | >10000 | — | x | P |
| 9# | >10000 | — | x | P |
| 10# | >10000 | — | x | P |
| Supplementary information: The maximum resistance measurement range is 10000MΩ. | | | | |

| 3.1.20 TABLE 20: MQT 15 Wet leakage current test (Final) | | | P |
|---|---|---|---|
| Test Date [YYYY-MM-DD].....: | 2025-04-02 | | — |
| Test Voltage applied [V] .....: | 1500 | | — |
| Solution temperature [°C] .....: | 22.1 | | — |
| Solution resistivity [Ω cm] .....: | 2525 | | — |
| Size of module [m²].....: | 2.04(sample 1-5)/<br>2.70(sample 6-10) | | — |
| Sample # | Required Resistance [MΩ] | Measured [MΩ] | Result |
| 2# | 19.61 | 6500 | P |
| 3# | 19.61 | 7800 | P |
| 4# | 19.61 | 8100 | P |
| 5# | 19.61 | 6900 | P |
| 7# | 14.81 | >10000 | P |
| 8# | 14.81 | >10000 | P |
| 9# | 14.81 | >10000 | P |

Doc No.: ITC-TTW0902.02E- Rev. 17

| | | | |
|---|---|---|---|
| 10# | 14.81 | >10000 | P |
| Supplementary information: The maximum resistance measurement range is 10000MΩ. | | | |

### 3.2 Remark:

**General**

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

### 3.3 Factory surveillance cycle

Your production facility is currently on a

☐ Annual (12 month)
☐ Bi-Annual (6 month)
☐ Quarterly (3 month)
☐

surveillance cycle.

### 3.4 Additional information for routine tests to be performed by the factory(ies)

**Routine tests for electrical appliances / equipment:**

Routine test requirements for production are described in annual inspection test reports.

## 4. Documentation

| File | File name | Date |
|---|---|---|
| Data form (CDF): | N/A | N/A |
| User manual: | N/A | N/A |
| Installation manual: | N/A | N/A |
| Product specifications: | N/A | N/A |

## 5.Summary

The test specification is met.



Doc No.: ITC-TTW0902.02E- Rev. 17

**TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch**
**TÜV SÜD Group**

Tested by: Yang Xu
*Printed name,function & signature*

Approved by: Tao Wang
*Printed name,function & signature*

Doc No.: ITC-TTW0902.02E- Rev. 17

**Annex 1: List of measurement equipment**

| SN | Model | SN | Effective date of calibration |
|---|---|---|---|
| Digital thermohygrometer | LYWSDCGQ/01ZM | HJE-036 | 2024.12.03-2025.12.02 |
| Light Meter | TES 1332A | HJE-013 | 2024.12.06-2025.12.05 |
| Transient simulator | GIV-30AC | HJE-028 | 2024.10.22-2025.10.21 |
| infrared thermometer gun | FLUKE 561 | HJE-009 | 2024.06.11-2025.06.10 |
| EL Tester | α7RⅡ | HJE-046 | / |
| DC source | 9360-30 1U | HJE-045 | 2024.12.03-2025.12.02 |
| Hail impact testing machine | YQ-GF-BB2 | HJE-058 | 2024.04.03-2025.04.02 |
| Electronic balances | ZG-TP203 | HJE-044 | 2024.12.03-2025.12.02 |
| Digital calipers | (0-150)mm | HJE-020 | 2024.12.03-2025.12.02 |
| stopwatch | PC2810 | HJE-040 | 2024.12.06-2025.12.05 |
| Horizontal refrigerated freezer conversion cabinet | BD-100 | HJE-099 | 2024.07.05-2025.07.04 |
| Refrigerator | BCD-223WDPT | HJE-101 | 2024.07.05-2025.07.04 |
| Insulation withstand voltage tester | ZW-HIT01-1203 | HJE-004 | 2024.12.03-2025.12.02 |
| Wet leakage test system | ZW-WLT02-151512252515 | HJE-003 | 2024.12.03-2025.12.02 |
| Conductivity meter | CCT-3320V | HJE-018 | 2024.12.03-2025.12.02 |

| Supplementary information | |
|---|---|
| Test location | Zhejiang HJE Co.,LTd.<br>3-4/F,Building 1, No.3556, Linggongtang Road,Nanhu District, Jiaxing Zhejiang,P.R.China. |
| Temperature | ( 23 ～ 28 )℃ |
| Humidity | ( 43 ～ 65)% |

**Annex 2: Statement of the estimated uncertainty of the test results**

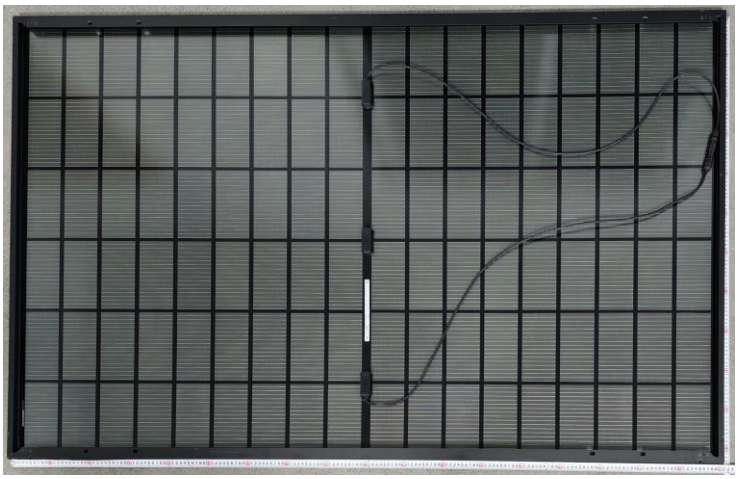
Statement of the estimated uncertainty of the I/V test.

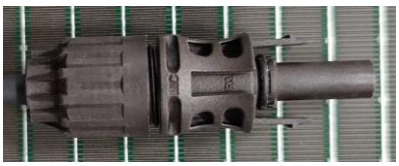
$I_{sc}$: $U_{rel}$=2.0% ($k$=2);
$V_{oc}$: $U_{rel}$=0.8% ($k$=2);
$P_{max}$: $U_{rel}$=2.0% ($k$=2);

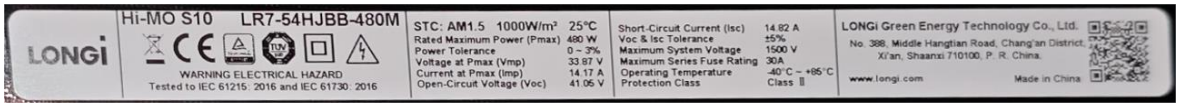
Doc No.: ITC-TTW0902.02E- Rev. 17

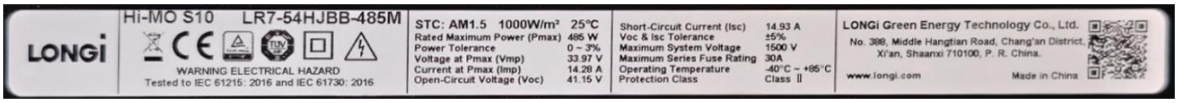
**Annex 3: Photos of module**

LR7-54HJBB

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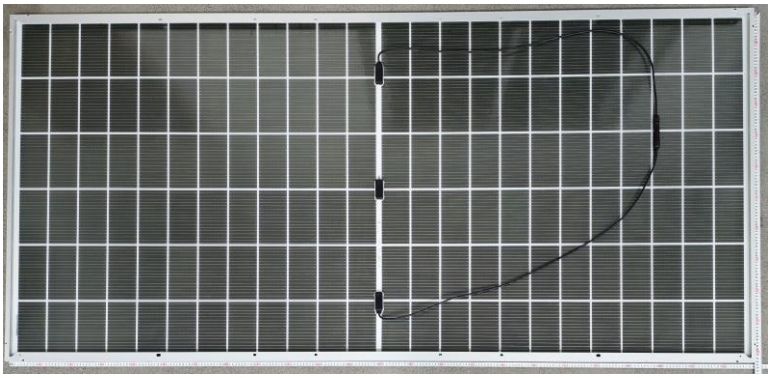


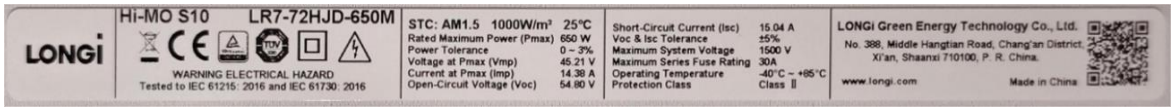


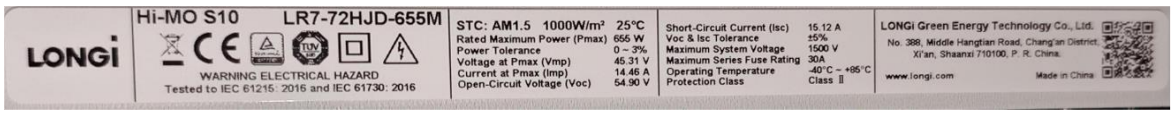


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