Choose certainty.
Add value.

**Technical Report No. 70.406.19.095.15**

**Rev. 00**

**Dated 2019-10-12**

| | |
|---|---|
| Client name: | Ningbo Ulica Solar Science&Technology Co.,Ltd |
| Client address: | NO.181, SHANSHAN ROAD, WANGCHUN INDUSTRIAL DISTRICT, NINGBO, CHINA |
| Client contact: | Mr. Shilan Liao |
| Manufacturing place: | Ningbo Ulica Solar Science&Technology Co.,Ltd<br>NO.181, SHANSHAN ROAD, WANGCHUN INDUSTRIAL DISTRICT, NINGBO, CHINA |
| Test subject: | Product: Photovoltaic module |
| Test specification: | IEC61215:2005-04, Second Edition, partial tests as below<br>10.1 Visual inspection<br>10.2 Maximum power determination,<br>10.16 Static mechanical load test<br><br>IEC 61730-1:2004 (First Edition) + A1:2011 + A2:2013;<br>IEC61730-2:2004 (First Edition) +A1:2011, partial tests as below<br>MST15 Wet leakage current test<br>MST16 Insulatin Test<br><br>EL Test |
| Purpose of examination: | Test according to the test specification, No relevant IEC standards for issue certificates. Only test character is necessary according to the client's requirement. |
| Test result: | The present test results show in clause 3. |









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## 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 1500 V DC.

### 1.2 Consideration of the foreseeable misuse

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

### 1.3 Technical Data

| Test sample No. | Model serial No. | Remark/constructional characteristics |
|---|---|---|
| GDP190632-1 | U610PM191JK1105B | 6" Poly module；60 pcs cells |
| GDP190632-2 | U610PM191JK1292B | 6" Poly module；60 pcs cells |

## 2 Order

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

The order dated 2019-10-09

### 2.2 Receipt of Test Sample, Location

2019-10-10, Yangzhou Opto-Electrical Products Testing Institute

No.10 West Kaifa Road, Yangzhou, Jiangsu, P.R. China

### 2.3 Date of Testing

2019-10-11

### 2.4 Location of Testing

Yangzhou Opto-Electrical Products Testing Institute

No.10 West Kaifa Road, Yangzhou, Jiangsu, P.R. China

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

N/A





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## 3 Test Results

| 3.1 Initial | Table: Visual inspection (Initial) | P |
|---|---|---|
| Test Date [MM/DD/YYYY]..... : | 10/11/2019 | — |
| Sample # | Nature and position of initial findings – comments or attach photos | — |
| GDP190632-1 | No major visual defects | P |
| GDP190632-2 | No major visual defects | P |
| Supplementary information: N/A | | |

| 3.2 Initial | Table: Maximum power determination (initial) | | | | | P |
|---|---|---|---|---|---|---|
| Test Date [MM/DD/YYYY]..... : | 10/11/2019 | | | | | — |
| Module temperature [°C]..... : | 25 | | | | | — |
| Irradiance [W/m$^2$]..... : | 1000 | | | | | — |
| Sample # | Voc [V] | Isc [A] | Vmp [V] | Imp [A] | Pmp [W] | FF [%] |
| GDP190632-1 | 38.380 | 9.333 | 31.617 | 8.896 | 281.274 | 78.52 |
| GDP190632-2 | 38.414 | 9.293 | 31.609 | 8.898 | 281.268 | 78.79 |
| Supplementary information: N/A | | | | | | |

| 3.3 Initial | Table: Insulation test (initial) | | | | P |
|---|---|---|---|---|---|
| Test Date [MM/DD/YYYY]..... : | | | 10/11/2019 | | — |
| Test Voltage applied [V] ..... : | | | 8000/1500 | | — |
| Sample # | Measured | Required | Dielectric breakdown | | Result |
| | MΩ | MΩ | Yes (description) | No | |
| GDP190632-1 | >5000 | 20.40 | No breakdown | X | P |
| GDP190632-1 | >5000 | 20.40 | No breakdown | X | P |
| Supplementary information: The area of sample is 1.64 m$^2$, Maximum resistance measurement range is 5000 MΩ | | | | | |

| 3.4 Initial | TABLE: Wet leakage current test (Initial) | | | P |
|---|---|---|---|---|
| Test Date [MM/DD/YYYY]..... : | | 10/11/2019 | | — |
| Test Voltage applied [V] ..... : | | 1500 | | — |
| Solution resistivity [Ω cm)..... : | | < 3,500 Ω cm at 22 ± 3°C | 2127 | P |
| Solution temperature [°C]..... : | | 22.75 | | P |
| Sample # | Measured [MΩ] | Limit [MΩ] | | Result |





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| | | | |
|---|---|---|---|
| GDP190632-1 | 415.4 | 20.40 | P |
| GDP190632-2 | 392.6 | 20.40 | P |
| Supplementary information: The area of sample is 1.64 $m^2$. | | | |

| **3.5: MQT 16 Static mechanical load test** | | | P |
|---|---|---|---|
| Sample # : | GDP190632-2 | | — |
| Test Date [MM/DD/YYYY] ..... | 10/11/2019 | | — |
| Mounting method .....: | According to client's requirement(8 screws fixing) | | — |
| Load applied to .....: | front side | back side | — |
| Mechanical load [Pa] .....: | 2400 | 2400 | — |
| First cycle time (start/end) .....: | 09:41/10:41 | 10:47/11:47 | — |
| Intermittent open-circuit (yes/no) .....: | No | no | P |
| Second cycle time (start/end) .....: | 11:53/12:53 | 12:59/13:59 | — |
| Intermittent open-circuit (yes/no) .....: | No | no | P |
| Third cycle time (start/end) .....: | 14:07/15:07(8000Pa) | 15:14/16:14 | — |
| Intermittent open-circuit (yes/no) .....: | No | no | P |
| Supplementary information: — | | | |

| **3.6 MQT 01 - Visual inspection after static mechanical load test** | | | | | | P |
|---|---|---|---|---|---|---|
| Test Date [YYYY-MM-DD].....: | 10/11/2019 | | | | | — |
| Sample # | Nature and position of initial findings – comments or attach photos | | | | | — |
| GDP190632-2 | No major visual defects | | | | | P |
| Supplementary information: N/A | | | | | | |
| **(10.2 Maximum power determination after static mechanical load test)** | | | | | | P |
| Test Date [MM/DD/YYYY] .....: | 10/11/2019 | | | | | — |
| Module temperature [°C].....: | 25 | | | | | — |
| Irradiance [W/$m^2$) .....: | 1000 | | | | | — |
| Sample # | Voc [V] | Isc [A] | Vmp [V] | Imp [A] | Pmp [W] | FF [%] |
| GDP190632-1 | 38.379 | 9.299 | 31.787 | 8.849 | 281.299 | 78.82 |
| GDP190632-2 | 38.405 | 9.050 | 31.814 | 8.751 | 278.590 | 80.16 |
| Pmp degradation after this test [%] ≤ 5%..... : | | | | GDP190632-1 | 0.008% | P |
| | | | | GDP190632-2 | -0.95% | P |
| Supplementary information: N/A | | | | | | |







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| 3.7 Initial | Table: Insulation test (Final) | | | | P |
|---|---|---|---|---|---|
| Test Date [MM/DD/YYYY]..... : | | | 10/11/2019 | | — |
| Test Voltage applied [V] ..... : | | | 8000/1500 | | — |
| Sample # | Measured | Required | Dielectric breakdown | | Result |
| | MΩ | MΩ | Yes (description) | No | |
| GDP190632-1 | >5000 | 20.40 | No breakdown | X | P |
| GDP190632-2 | >5000 | 20.40 | No breakdown | X | P |
| Supplementary information: The area of sample is 1.64 $m^2$, Maximum resistance measurement range is 5000 MΩ | | | | | |

| 3.8 Initial | TABLE: Wet leakage current test (Final) | | | P |
|---|---|---|---|---|
| Test Date [MM/DD/YYYY]..... : | | 10/11/2019 | | — |
| Test Voltage applied [V] ..... : | | 1500 | | — |
| Solution resistivity [Ω cm)..... : | | < 3,500 Ω cm at 22 ± 3°C | 2439 | P |
| Solution temperature [°C] ..... : | | 22.8 | | P |
| Sample # | Measured [MΩ] | Limit [MΩ] | | Result |
| GDP190632-1 | 423.8 | 20.40 | | P |
| GDP190632-2 | 396.4 | 20.40 | | P |
| Supplementary information: The area of sample is 1.64 $m^2$. | | | | |







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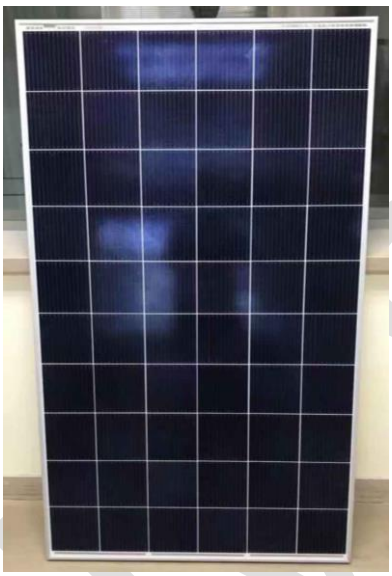
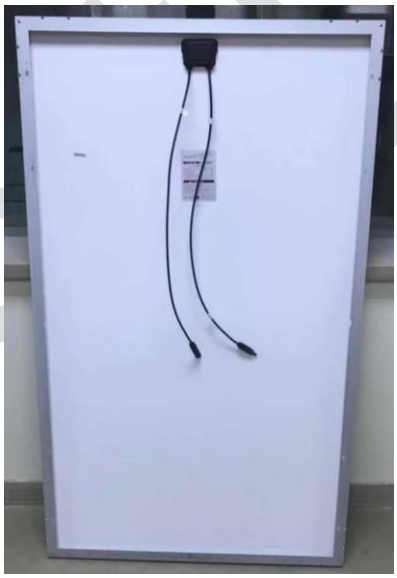
## 4 Remark

N/A

## 5 Appendix

Appendix 1: Sample picture











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Appendix 2**:** List of measurement equipment

| Clause | Measurement / testing | Testing / measuring equipment / material used, (Equipment ID) | Range used | Last Calibration date | Calibration due date |
|---|---|---|---|---|---|
| MQT01 | — | SB08102 | — | 2019-05-03 | 2020-05-02 |
| MQT01 | — | SB08108 | — | 2019-04-29 | 2020-04-28 |
| MQT01 | — | SB08111 | — | 2019-06-20 | 2020-06-19 |
| MQT01 | — | SB08092 | — | 2019-04-29 | 2020-04-28 |
| MQT01 | — | SB08125 | — | 2019-04-26 | 2020-04-25 |
| MQT02 | — | SB08001 | — | 2019-04-07 | 2020-04-06 |
| MQT03&MQT15 | — | SB10018 | — | 2019-05-26 | 2020-05-25 |
| MQT15 | — | SB08079 | — | 2019-04-20 | 2020-04-19 |
| MQT15 | — | SB08054 | — | 2019-04-20 | 2020-04-19 |
| MQT16 | — | SB01009 | — | — | — |
| MQT16 | — | SB10007 | — | 2019-05-21 | 2020-05-20 |

Appendix 3**:** Statement of the estimated uncertainty of the test results

| |
|---|
| The power measurement uncertainty is 2.28% (K=2). |

## 6 Summary

The test specifications are met.





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