

**URS PRODUCTS AND TESTING PRIVATE LIMITED**

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CIN NO U21014UP1987PTC008956

**TEST REPORT IEC****62716:2013****Photovoltaic (PV) modules - Ammonia corrosion testing**

|                 |                           |                |            |
|-----------------|---------------------------|----------------|------------|
| TEST REPORT NO: | URS/LAB/02/RID/25-26/7724 | DATE OF ISSUE: | 01/08/2025 |
|-----------------|---------------------------|----------------|------------|

|                        |                                          |
|------------------------|------------------------------------------|
| NAME OF LABORATORY:    | URS PRODUCTS AND TESTING PRIVATE LIMITED |
| ADDRESS OF LABORATORY: | A-29, Sector 5, Noida-201301, India      |
| TESTING LOCATION:      | A-29, Sector 5, Noida-201301, India      |

|                   |                                                                     |
|-------------------|---------------------------------------------------------------------|
| CUSTOMER NAME:    | INTEGRATED BATTERIES INDIA PVT LTD.                                 |
| CUSTOMER ADDRESS: | PLOT NO.40, ECOTECH-10, GREATER NOIDA, UTTAR PRADESH, 201301, INDIA |

| TEST ITEM DESCRIPTION   |                                                                                    |                   |                |
|-------------------------|------------------------------------------------------------------------------------|-------------------|----------------|
| PRODUCT NAME:           | Solar Photovoltaic (PV) Module(s)                                                  |                   |                |
| DATE OF RECEIPT         | 01/08/2025                                                                         | SAMPLE CONDITION: | ok             |
| RECEIPT NUMBER          | URS/LAB/CSPL1/25-26/78F5E583                                                       | NO. OF SAMPLE     | 3              |
| TRADE MARK              | lb SOLAR                                                                           | SERIAL NUMBER     | See page no. 7 |
| MODEL                   | IBMPF-xxx (xxx=380-400, in step of 5 W)<br>IBMPH-xxx (xxx=405-640, in step of 5 W) |                   |                |
| RATINGS/SPECIFICATION   | See the marking Label (Page no. 03)                                                |                   |                |
| NAME OF MANUFACTURER    | INTEGRATED BATTERIES INDIA PVT LTD.                                                |                   |                |
| ADDRESS OF MANUFACTURER | PLOT NO.40, ECOTECH-10, GREATER NOIDA, UTTAR PRADESH, 201301, INDIA                |                   |                |

| TEST SPECIFICATION       |                |                                   |            |
|--------------------------|----------------|-----------------------------------|------------|
| TEST METHOD / STANDARD   |                | IEC 62716: 2013<br>EN 62716: 2013 |            |
| TEST START DATE          | 01/08/2025     | TEST END DATE                     | 01/08/2025 |
| ENVIRONMENTAL CONDITIONS | 23±5°C, <70%RH |                                   |            |

| CONCLUSION  |                                                                                                                                                   |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| TEST RESULT | The test result conform to the requirement of the standard/test protocol based on the obtained test values/results mentioned in this test report. |

|        |                                                                                                                                                                                                    |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REMARK | This report is issued with reference of the earlier tested report having test report no. "6217124B.51" dated "2025-04-21" (YYYY-MM-DD) issued by "DEKRA Testing and Certification (Shanghai) Ltd." |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

TESTED BY



Abhishek Kumar Bhashker  
Asst.Manager

AUTHORIZED SIGNATURE



Paras Singh  
Vice President (Technical)

ISSUED BY

Paras Singh  
Vice President (Technical)

## Note:

1. This test report is valid only for the sample(s) tested in our laboratory. 2. The test report is not permitted to be duplicated/reproduced in part or in extract in any circumstances. 3. URS lab is not responsible for authenticity of photocopied or reproduced test report. 4. The test results reported in this report are valid at the time of and under the stated conditions of measurements. 5. The remnant(Tested Samples)shall be destroyed after 07days from the date of testing unless specified otherwise in writing. 6. Any correction/erasure shall invalidate the test report. 7. This test report pertains to the test(s) carried out as requested by the customer. 8. This test report shall not be utilized for any legal purpose and shall not be produced in the court of law & no responsibility would be attached to URS Lab 9. URS reports, in general, are formally released in soft copy through reports@urs-labs.com , client portal, unless client will specifically request with sign & stamped letter with the intent to issue test reports in hard copy form. URS will not acknowledge for the reports said to be released through other means such as what's app. Test Reports for specific schemes such as BIS CRS/LRS schemes, are issued as per specific scheme requirements. 10. Standard Test Method / Test Protocol specified in this Test Report is used as reference only.



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**DATE OF ISSUE:** 01/08/2025

**CUSTOMER NAME:** INTEGRATED BATTERIES INDIA PVT LTD.

**CUSTOMER CITY:** NOIDA

| Summary of testing:                                                                                                                                                                                                                                                                                           |                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Tests performed (name of test and test clause):</b><br>Visual inspection (MST 01)<br>Maximum power determination (10.2)<br>Dielectric withstand test (MST 16)<br>Wet leakage current test (10.15)<br>Ground continuity test (MST 13)<br>Ammonia corrosion test<br>Bypass diode functionality test (MST 07) | <b>Testing location:</b><br>URS PRODUCTS AND TESTING PRIVATE LIMITED.<br>A-29, Sector 5, Noida-201301, India |

This report is issued with reference of the earlier tested report having test report no. "6217124B.51" dated "2025-04-21" (YYYY-MM-DD) issued by "DEKRA Testing and Certification (Shanghai) Ltd."

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**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective Manufacturer that own these marks.

|                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                         |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------|---------------|----------|---------------|----------|----------------------------|----------|-----------------------------|----------|------------------------|---------|---------------------|-------|-------------------|----------------------|-------------|-----------|------------------------------------------------------------------------------------|
| <br><small>Assembled at:</small><br>INTEGRATED BATTERIES INDIA PVT LTD.<br>Plot No. 43 Ecotech 19 Gr. Noida 201301<br>Website: <a href="http://www.ibsolar.co.in">www.ibsolar.co.in</a><br><br><small>Manufactured in: ISO 9001 certified facility in Greater Noida, INDIA</small> | <b>Model No :- IBMPH-640</b><br><br>POWER SPECIFICATION MEASURED AT STC<br>IRRADIANCE : 1000WM2, AM : 1.5, CELL TEMPERATURE : 25°C                                                                                                                                                                                                                                                                                                                                                                             | <b>WARNING ELECTRICAL HAZARD</b><br><br>This solar module produces DC electricity when exposed to light |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                     | <table><tr><td>Pmax</td><td>: 640W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 48.65V</td></tr><tr><td>Current (Imp)</td><td>: 13.72A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 58.12V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.51A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table> | Pmax                                                                                                    | : 640W ± 2% | Voltage (Vmp) | : 48.65V | Current (Imp) | : 13.72A | Open Circuit Voltage (Voc) | : 58.12V | Short Circuit Current (Isc) | : 14.51A | Maximum System Voltage | : 1500V | Maximum series Fuse | : 30A | Application Class | : A(Safety Class II) | Fire Rating | : Class C |  |
| Pmax                                                                                                                                                                                                                                                                                                                                                                | : 640W ± 2%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                         |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |
| Voltage (Vmp)                                                                                                                                                                                                                                                                                                                                                       | : 48.65V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                         |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |
| Current (Imp)                                                                                                                                                                                                                                                                                                                                                       | : 13.72A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                         |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |
| Open Circuit Voltage (Voc)                                                                                                                                                                                                                                                                                                                                          | : 58.12V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                         |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |
| Short Circuit Current (Isc)                                                                                                                                                                                                                                                                                                                                         | : 14.51A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                         |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |
| Maximum System Voltage                                                                                                                                                                                                                                                                                                                                              | : 1500V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                         |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |
| Maximum series Fuse                                                                                                                                                                                                                                                                                                                                                 | : 30A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                         |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |
| Application Class                                                                                                                                                                                                                                                                                                                                                   | : A(Safety Class II)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                         |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |
| Fire Rating                                                                                                                                                                                                                                                                                                                                                         | : Class C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                         |             |               |          |               |          |                            |          |                             |          |                        |         |                     |       |                   |                      |             |           |                                                                                    |

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Abhishek Kumar Bhashker  
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- test case does not apply to the test object..... : N/A
- test object does meet the requirement ..... : P (Pass)
- test object does not meet the requirement ..... : F (Fail)

**Abbreviations used in the report:**

|                                                                           |                                                                           |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Pmax – Maximum power                                                      | $\alpha$ – Current temperature coefficient                                |
| Vmp – Maximum power voltage                                               | $\beta$ – Voltage temperature coefficient                                 |
| Imp – Maximum power current                                               | $\delta$ – power temperature coefficient                                  |
| Isc – Short circuit current                                               | NMOT – Nominal Module Operating Temperature (20°C, 800 W/m <sup>2</sup> ) |
| Voc – Open circuit voltage                                                | VFMrated – Rated diode(s) forward voltage                                 |
| FF – Fill factor                                                          | VFM – Measured diode(s) forward voltage                                   |
| STC – Standard Test Conditions (25°C, 1 000 W/m <sup>2</sup> )            | NP – Nameplate                                                            |
| $t_1$ – the manufacturer's rated lower production tolerance in % for Pmax | $t_2$ – the manufacturer's rated upper production tolerance in % for Voc  |
| $t_3$ – the manufacturer's rated upper production tolerance in % for Isc  | r – Pmax measurement reproducibility                                      |
| $m_1$ – the measurement uncertainty in % of laboratory for Pmax           | $m_2$ – the measurement uncertainty in % of laboratory for Voc            |
| $m_3$ – the measurement uncertainty in % of laboratory for Isc            |                                                                           |

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According to the inquiry, test procedure was in accordance with IEC 62716:2013, EN 62716:2013.  
Test procedure is according to client's requirements. Test results are documented within this test report.

Maximum System Voltage: 1500 V

Hours: 8h including heating up (1 test section), 16h including cooling (2 test section)

NH3 concentration: 6667ppm (1 test section), 0ppm (2 test section)

Temperature: 60°C (1 test section), 18°C -28°C (2 test section)

Relative humidity: nearly 100% (1 test section), max. 75% (2 test section)

Duration: 20 cycles = 480 hours (20 days)

Product material information is listed as below:

All tests were performed in this test report.

"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

|                                                |                                                                                                               |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Name and address of factory (factories)..... : | INTEGRATED BATTERIES INDIA PVT LTD.<br>PLOT NO.40, ECOTECH-10, GREATER NOIDA,<br>UTTAR PRADESH, 201301, INDIA |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------|

**PRODUCT ELECTRICAL RATINGS:**

|                                            |           |   |   |   |
|--------------------------------------------|-----------|---|---|---|
| Module type                                | IBMPH-640 | - | - | - |
| Voc [V]                                    | 56.12     | - | - | - |
| Vmp [V]                                    | 46.65     | - | - | - |
| Imax [Adc]                                 | 13.72     | - | - | - |
| Isc [Adc]                                  | 14.51     | - | - | - |
| Pmp [W]                                    | 640       | - | - | - |
| Maximum system voltage [V]                 | 1500      | - | - | - |
| Maximum Over-Current Protection Rating [A] | 25        | - | - | - |

Note:

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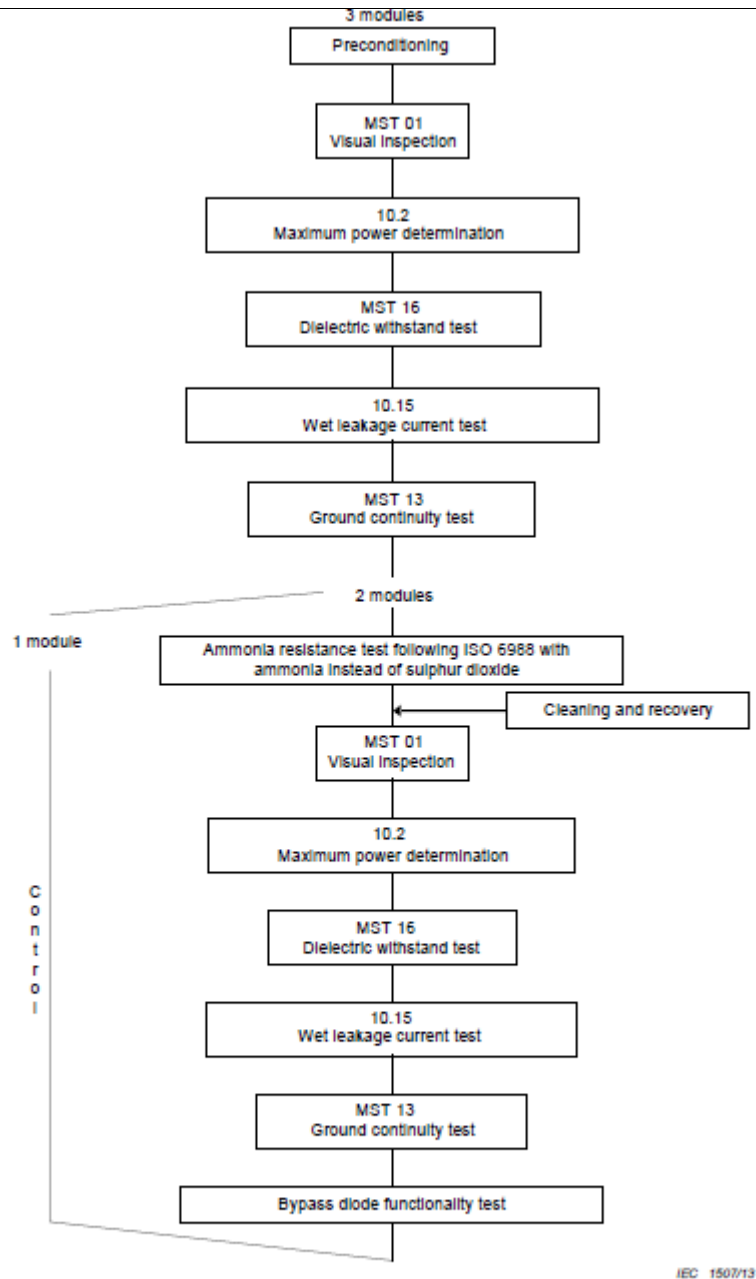
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**CUSTOMER CITY:** NOIDA

**TEST SEQUENCE:**



NOTE 1 Preconditioning and tests 10.2 and 10.15 are taken from IEC 61215:2005. Tests MST 01, MST 13 and MST 16 are taken from IEC 61730-2:2004.

NOTE 2 The control module should be used as a check every time the test modules are measured to evaluate the effect of the salt mist test.

Remark: Figure 1 of standard IEC 62716:2013

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| IEC 62716:2013 |                    |                 |         |
|----------------|--------------------|-----------------|---------|
| Clause         | Requirement + Test | Result - Remark | Verdict |

**MODULE GROUP ASSIGNMENT:**

| Sample # | Type/model | Sample S/N      | Remark  |
|----------|------------|-----------------|---------|
| 1        | IBMPH-640  | IB6400125197148 | Control |
| 2        | IBMPH-640  | IB6400125197143 | Ammonia |
| 3        | IBMPH-640  | IB6400125197145 | Ammonia |

Remarks: N/A

| TESTING OVERVIEW                           |              | — |
|--------------------------------------------|--------------|---|
| Initial Visual inspection (MST 01)         | See Table 01 | P |
| Initial Maximum power determination (10.2) | See Table 02 | — |
| Initial Dielectric withstand test (MST 16) | See Table 03 | P |
| Initial Wet leakage current test (10.15)   | See Table 04 | P |
| Initial Ground continuity test (MST 13)    | See Table 05 | P |
| Ammonia corrosion test                     | See Table 06 | — |
| Final Visual inspection (MST 01)           | See Table 07 | P |
| Final Maximum power determination (10.2)   | See Table 08 | P |
| Final Dielectric withstand test (MST 16)   | See Table 09 | P |
| Final Wet leakage current test (10.15)     | See Table 10 | P |
| Final Ground continuity test (MST 13)      | See Table 11 | P |
| Bypass diode functionality test (MST 07)   | See Table 12 | P |

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| IEC 62716:2013 |                    |                 |         |
|----------------|--------------------|-----------------|---------|
| Clause         | Requirement + Test | Result - Remark | Verdict |

**Table 01: Initial Visual inspection**

|                                |                                                             |                                                                          |   |
|--------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------|---|
| Test Date (YYYY-MM-DD).....:   |                                                             | 2025-02-26                                                               | — |
| Sample #<br>1                  | Findings .....                                              | <input type="checkbox"/> Yes..... <input checked="" type="checkbox"/> No | P |
|                                | Nature and position of findings – comments or attach photos | -                                                                        | — |
| Sample #<br>2                  | Findings .....                                              | <input type="checkbox"/> Yes..... <input checked="" type="checkbox"/> No | P |
|                                | Nature and position of findings – comments or attach photos | -                                                                        | — |
| Sample #<br>3                  | Findings .....                                              | <input type="checkbox"/> Yes..... <input checked="" type="checkbox"/> No | P |
|                                | Nature and position of findings – comments or attach photos | -                                                                        | — |
| Supplementary information: N/A |                                                             |                                                                          |   |

**Table 02: Initial Maximum power determination**

|                                                          |              |              |              |                                                                                         |               |        |        |
|----------------------------------------------------------|--------------|--------------|--------------|-----------------------------------------------------------------------------------------|---------------|--------|--------|
| Test Date [YYYY-MM-DD] ..... :                           |              |              |              | 2025-02-26                                                                              |               |        | —      |
| Irradiance (W/m²) ..... :                                |              |              |              | 1000                                                                                    |               |        | —      |
| Module temperature (°C) ..... :                          |              |              |              | 25                                                                                      |               |        | —      |
| Test method ..... :                                      |              |              |              | <input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight |               |        | —      |
| Sample #                                                 | $I_{sc}$ [A] | $V_{oc}$ [V] | $I_{mp}$ [A] | $V_{mp}$ [V]                                                                            | $P_{max}$ [W] | FF [%] | Result |
| 1                                                        | 14.517       | 56.142       | 13.750       | 46.646                                                                                  | 641.355       | 78.69  | —      |
| 2                                                        | 14.518       | 56.091       | 13.733       | 46.642                                                                                  | 640.524       | 78.66  | —      |
| 3                                                        | 14.512       | 56.154       | 13.744       | 46.644                                                                                  | 641.088       | 78.67  | —      |
| Supplementary information: After Stabilization procedure |              |              |              |                                                                                         |               |        |        |

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| Table 03: MST 16 - Initial Dielectric withstand test                       |          |            |                      |    |        |
|----------------------------------------------------------------------------|----------|------------|----------------------|----|--------|
| Test Date (YYYY-MM-DD)..... :                                              |          | 2025-02-26 |                      |    | —      |
| Test Voltage applied (V, DC) .....                                         |          | 8000/1500  |                      |    | —      |
| Sample #                                                                   | Measured | Required   | Dielectric breakdown |    | Result |
|                                                                            | MΩ       | MΩ         | Yes (description)    | No |        |
| 1                                                                          | >5000    | 14.29      | -                    | No | P      |
| 2                                                                          | >5000    | 14.29      | -                    | No | P      |
| 3                                                                          | >5000    | 14.29      | -                    | No | P      |
| Supplementary information: The insulation tester can measure up to 5000MΩ. |          |            |                      |    |        |

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| IEC 62716:2013                                                                      |                                   |                        |         |
|-------------------------------------------------------------------------------------|-----------------------------------|------------------------|---------|
| Clause                                                                              | Requirement + Test                | Result - Remark        | Verdict |
| <b>Table 04: Initial Wet leakage current test</b>                                   |                                   |                        |         |
| Test Date (YYYY-MM-DD) .....                                                        |                                   | 2025-02-26             | —       |
| Test Voltage applied (V, dc) .....                                                  |                                   | 1500                   | —       |
| Solution resistivity ( $\Omega$ cm).....                                            |                                   | 2675                   | —       |
| Solution temperature ( $^{\circ}$ C).....                                           |                                   | 22.5                   | —       |
| Size of module [ $m^2$ ].....                                                       |                                   | 2.80                   | —       |
| Sample #                                                                            | Required Resistance [ $M\Omega$ ] | Measured [ $M\Omega$ ] | Result  |
| 1                                                                                   | 14.29                             | >5000                  | P       |
| 2                                                                                   | 14.29                             | >5000                  | P       |
| 3                                                                                   | 14.29                             | >5000                  | P       |
| Supplementary information: The insulation tester can measure up to 5000M $\Omega$ . |                                   |                        |         |

| Table 05: MST 13 – Initial Ground continuity test  |                 |                                                                                                                      |        |
|----------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------|--------|
| Test Date Initial examination (YYYY-MM-DD) ..... : |                 | 2025-02-26                                                                                                           | —      |
| Maximum over-current protection rating (A) .....:  |                 | 25                                                                                                                   | —      |
| Current applied (A) .....:                         |                 | 62.5                                                                                                                 | —      |
| Location of designated grounding point.....:       |                 | The center of one longer side                                                                                        | —      |
| No. of other conductive parts tested .....         |                 | The center of the other longer side<br>The center of one shorter longer side<br>The center of the other shorter side | —      |
| Sample #                                           | Resistance [mΩ] |                                                                                                                      | Result |
| 1                                                  | 0.488           |                                                                                                                      | P      |
|                                                    | 0.512           |                                                                                                                      |        |
|                                                    | 0.522           |                                                                                                                      |        |
| 2                                                  | 0.509           |                                                                                                                      | P      |
|                                                    | 0.508           |                                                                                                                      |        |
|                                                    | 0.489           |                                                                                                                      |        |
| 3                                                  | 0.480           |                                                                                                                      | P      |
|                                                    | 0.512           |                                                                                                                      |        |
|                                                    | 0.528           |                                                                                                                      |        |
| Supplementary information: N/A                     |                 |                                                                                                                      |        |

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| IEC 62716:2013                       |                    |                                                                                                                                                                            |         |
|--------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Clause                               | Requirement + Test | Result - Remark                                                                                                                                                            | Verdict |
| Table 06: Ammonia corrosion test     |                    |                                                                                                                                                                            |         |
| Test Date (YYYY-MM-DD / YYYY-MM-DD): |                    | 2025-02-28 / 2025-03-20                                                                                                                                                    | —       |
| NH3 concentration [ppm]              |                    | 6667                                                                                                                                                                       |         |
| Temperature [°C]                     |                    | 60                                                                                                                                                                         |         |
| Relative humidity [%]                |                    | 100                                                                                                                                                                        |         |
| Course of cycle                      |                    | - exposure of NH3 for 8 hours and 60°C with nearly 100% condensation on the samples<br>- drying for 16 hours at normal atmosphere (18°C - 28°C and max. 75% rel. humidity) |         |
| Duration                             |                    | 20 cycles = 480 hours (20 days)                                                                                                                                            |         |
| Comment                              |                    | According to DIN EN ISO 3231/DIN EN ISO 6988<br>DIN 50018                                                                                                                  |         |
| Sample #                             | —                  |                                                                                                                                                                            | —       |
| 2                                    | -                  |                                                                                                                                                                            | —       |
| 3                                    | -                  |                                                                                                                                                                            | —       |
| Supplementary information: N/A       |                    |                                                                                                                                                                            |         |

|                                          |                                                             |                                                                          |   |
|------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------|---|
| <b>Table 07: Final Visual inspection</b> |                                                             |                                                                          |   |
| Test Date (YYYY-MM-DD).....:             |                                                             | 2025-03-24                                                               | — |
| Sample #<br>1                            | Findings .....                                              | <input type="checkbox"/> Yes..... <input checked="" type="checkbox"/> No | P |
|                                          | Nature and position of findings – comments or attach photos | -                                                                        | — |
| Sample #<br>2                            | Findings .....                                              | <input type="checkbox"/> Yes..... <input checked="" type="checkbox"/> No | P |
|                                          | Nature and position of findings – comments or attach photos | -                                                                        | — |
| Sample #<br>3                            | Findings .....                                              | <input type="checkbox"/> Yes..... <input checked="" type="checkbox"/> No | P |
|                                          | Nature and position of findings – comments or attach photos | -                                                                        | — |
| Supplementary information: N/A           |                                                             |                                                                          |   |

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| IEC 62716:2013                              |                     |                     |                     |                                                                                         |                      |        |                 |         |
|---------------------------------------------|---------------------|---------------------|---------------------|-----------------------------------------------------------------------------------------|----------------------|--------|-----------------|---------|
| Clause                                      | Requirement + Test  |                     |                     |                                                                                         | Result - Remark      |        |                 | Verdict |
| TABLE 08: Final Maximum power determination |                     |                     |                     |                                                                                         |                      |        |                 |         |
| Test Date [YYYY-MM-DD] .....                |                     |                     |                     | 2025-03-24                                                                              |                      |        |                 | —       |
| Test method .....                           |                     |                     |                     | <input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight |                      |        |                 | —       |
| Irradiance [W/m²] .....                     |                     |                     |                     | 1000                                                                                    |                      |        |                 | —       |
| Module temperature [°C] .....               |                     |                     |                     | 25                                                                                      |                      |        |                 | —       |
| Sample #                                    | I <sub>sc</sub> [A] | V <sub>oc</sub> [V] | I <sub>mp</sub> [A] | V <sub>mp</sub> [V]                                                                     | P <sub>max</sub> [W] | FF [%] | Degradation [%] | Result  |
| 1                                           | 14.506              | 56.176              | 13.731              | 46.802                                                                                  | 642.630              | 78.86  | 0.20            | P       |
| 2                                           | 14.485              | 56.072              | 13.699              | 46.519                                                                                  | 637.246              | 78.46  | -0.51           | P       |
| 3                                           | 14.488              | 56.129              | 13.706              | 46.453                                                                                  | 636.679              | 78.30  | -0.69           | P       |
| Supplementary information: N/A              |                     |                     |                     |                                                                                         |                      |        |                 |         |

| <b>Table 09: MST 16 - Final Dielectric withstand test</b>                  |          |          |                      |            |        |
|----------------------------------------------------------------------------|----------|----------|----------------------|------------|--------|
| Test Date (YYYY-MM-DD) .....                                               |          |          |                      | 2025-03-24 |        |
| Test Voltage applied (V, DC) .....                                         |          |          |                      | 8000/1500  |        |
| Sample #                                                                   | Measured | Required | Dielectric breakdown |            | Result |
|                                                                            | MΩ       | MΩ       | Yes (description)    | No         |        |
| 1                                                                          | >5000    | 14.29    | -                    | No         | P      |
| 2                                                                          | >5000    | 14.29    | -                    | No         | P      |
| 3                                                                          | >5000    | 14.29    | -                    | No         | P      |
| Supplementary information: The insulation tester can measure up to 5000MΩ. |          |          |                      |            |        |

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| Table 10: Final Wet leakage current test                                            |                                   |                        |        |
|-------------------------------------------------------------------------------------|-----------------------------------|------------------------|--------|
| Test Date (YYYY-MM-DD) .....                                                        |                                   | 2025-03-24             | —      |
| Test Voltage applied (V, dc) .....                                                  |                                   | 1500                   | —      |
| Solution resistivity ( $\Omega$ cm).....                                            |                                   | 2344                   | —      |
| Solution temperature ( $^{\circ}$ C).....                                           |                                   | 24.8                   | —      |
| Size of module [ $m^2$ ].....                                                       |                                   | 2.80                   | —      |
| Sample #                                                                            | Required Resistance [ $M\Omega$ ] | Measured [ $M\Omega$ ] | Result |
| 1                                                                                   | 14.29                             | >5000                  | P      |
| 2                                                                                   | 14.29                             | >5000                  | P      |
| 3                                                                                   | 14.29                             | >5000                  | P      |
| Supplementary information: The insulation tester can measure up to 5000M $\Omega$ . |                                   |                        |        |

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| IEC 62716:2013                                   |                                                                                                                      |                 |         |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause                                           | Requirement + Test                                                                                                   | Result - Remark | Verdict |
| Table 11: MST 13 – Final Ground continuity test  |                                                                                                                      |                 |         |
| Test Date Final examination (YYYY-MM-DD) .....   | 2025-03-25                                                                                                           | —               |         |
| Maximum over-current protection rating (A) ..... | 25                                                                                                                   | —               |         |
| Current applied (A) .....                        | 62.5                                                                                                                 | —               |         |
| Location of designated grounding point.....      | The center of one longer side                                                                                        | —               |         |
| No. of other conductive parts tested .....       | The center of the other longer side<br>The center of one shorter longer side<br>The center of the other shorter side | —               |         |
| Sample #                                         | Resistance [mΩ]                                                                                                      |                 | Result  |
| 1                                                | 0.489<br>0.418<br>0.433                                                                                              |                 | P       |
| 2                                                | 0.501<br>0.508<br>0.512                                                                                              |                 | P       |
| 3                                                | 0.455<br>0.432<br>0.412                                                                                              |                 | P       |
| Supplementary information: N/A                   |                                                                                                                      |                 |         |

| <b>Table 12: Bypass diode functionality test</b> |                                                                     |                                                                     |                                                                     |        |
|--------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|--------|
| Test Date (YYYY-MM-DD).....                      | 2025-03-25                                                          |                                                                     |                                                                     | —      |
| Sample #                                         | IV curve after shading                                              |                                                                     |                                                                     | Result |
|                                                  | Diode 1 working properly                                            | Diode 2 working properly                                            | Diode 3 working properly                                            |        |
| 1                                                | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | P      |
| 2                                                | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | P      |
| 3                                                | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | P      |
| Supplementary information: N/A                   |                                                                     |                                                                     |                                                                     |        |

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**Annex 1: Photographs of test sample**

**Module type:** IBMPH-640



*Fig. 1: front view of test sample*



*Fig. 2: rear view of test sample*

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| Measurement / testing            | Testing / measuring equipment / material used, (Equipment ID) | Range used                                            | Last Calibration date | Calibration due date |
|----------------------------------|---------------------------------------------------------------|-------------------------------------------------------|-----------------------|----------------------|
| Visual inspection test           | Visual inspection bench<br>BS-PV 010                          | -                                                     | -                     | -                    |
|                                  | Illumination photometer<br>BS-PV 036                          | 2000lx                                                | 2025-02-27            | 2026-02-26           |
| Maximum power determination test | Pulse solar simulator<br>BS-PV 057                            | A+AA+                                                 | 2024-07-29            | 2025-07-28           |
|                                  | Electrical Load<br>BS-PV 057-02                               | -15V~420V<br>-50A~50A                                 | 2024-07-29            | 2025-07-28           |
|                                  | Reference Module<br>BS-PV 057-05                              | -                                                     | 2024-07-08            | 2025-07-09           |
| Dielectric withstand test        | Insulation tester<br>BS-PV 090                                | Test voltage:<br>0~10kV<br>Result range:<br>0~50000MΩ | 2024-05-22            | 2025-05-21           |
| Wet leakage current test         | Water tank BS-PV 047-01                                       | 22 ± 2°C                                              | 2024-05-22            | 2025-05-21           |
|                                  | Insulation resistance tester<br>BS-PV 090                     | Test voltage:<br>0~10kV<br>Result range:<br>0~50000MΩ | 2024-05-22            | 2025-05-21           |
|                                  | Conductivity meter BS-PV<br>047-02                            | 0~1999μs/cm,<br>10.0~40.0°C                           | 2024-05-22            | 2025-05-21           |
| Ground continuity test           | Ground Resistance Tester<br>BS-PV 025                         | 10~60A                                                | 2024-03-27            | 2025-03-26           |
| Ammonia resistance test          | Ammonia test Chamber<br>BS-PV 112                             | 30~60°C<br>45%~98%RH<br>0~6667ppm                     | 2024-06-24            | 2025-06-23           |
| Bypass diode functionality test  | Pulse solar simulator<br>BS-PV 057                            | A+AA+                                                 | 2024-07-29            | 2025-07-28           |

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**Annex 3: Statement of test uncertainty**

The total measuring uncertainty of Pmpp is  $\leq 2.47\%$

The total measuring uncertainty of Isc is  $\leq 2.35\%$

The total measuring uncertainty of Voc is  $\leq 0.84\%$

**Annex 4:**

This report is issued with reference of the earlier tested report having test report no. "6217124B.51" dated "2025-04-21" (YYYY-MM-DD) issued by "DEKRA Testing and Certification (Shanghai) Ltd."

| Test                                          | Compliance | Reference |
|-----------------------------------------------|------------|-----------|
| Initial Visual inspection<br>(MST 01)         | Pass       | Table 01  |
| Initial Maximum power<br>determination (10.2) | --         | Table 02  |
| Initial Dielectric withstand test<br>(MST 16) | Pass       | Table 03  |
| Initial Wet leakage current test<br>(10.15)   | Pass       | Table 04  |
| Initial Ground continuity test<br>(MST 13)    | Pass       | Table 05  |
| Ammonia corrosion test                        | --         | Table 06  |
| Final Visual inspection<br>(MST 01)           | Pass       | Table 07  |
| Final Maximum power<br>determination (10.2)   | Pass       | Table 08  |
| Final Dielectric withstand test<br>(MST 16)   | Pass       | Table 09  |
| Final Wet leakage current test<br>(10.15)     | Pass       | Table 10  |
| Final Ground continuity test<br>(MST 13)      | Pass       | Table 11  |
| Bypass diode functionality test<br>(MST 07)   | Pass       | Table 12  |

..... **End of test report** .....

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