

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                               |                                                                                     |                                          |                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Prüfbericht-Nr.:</b><br>Test report no.:                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>CN244Y4S 001</b>                                                                                                           | <b>Auftrags-Nr.:</b><br>Order no.:                                                  | 326059783                                | Seite 1 von 29<br>Page 1 of 29                                                                   |
| <b>Kunden-Referenz-Nr.:</b><br>Client reference no.:                                                                                                                                                                                                                                                                                                                                                                                                                 | 2089836                                                                                                                       | <b>Auftragsdatum:</b><br>Order date:                                                | 2024-10-28                               |                                                                                                  |
| <b>Auftraggeber:</b><br>Client:                                                                                                                                                                                                                                                                                                                                                                                                                                      | Pylon Technologies Co., Ltd.<br>No.300, Miaoqiao Road, Kangqiao Town, Pudong New Area, 201315 Shanghai, P.R. China            |                                                                                     |                                          |                                                                                                  |
| <b>Prüfgegenstand:</b><br>Test item:                                                                                                                                                                                                                                                                                                                                                                                                                                 | Rechargeable Li-ion Battery                                                                                                   |                                                                                     |                                          |                                                                                                  |
| <b>Bezeichnung / Typ-Nr.:</b><br>Identification / Type no.:                                                                                                                                                                                                                                                                                                                                                                                                          | HM7A200L                                                                                                                      |                                                                                     |                                          |                                                                                                  |
| <b>Auftrags-Inhalt:</b><br>Order content:                                                                                                                                                                                                                                                                                                                                                                                                                            | Test report                                                                                                                   |                                                                                     |                                          |                                                                                                  |
| <b>Prüfgrundlage:</b><br>Test specification:                                                                                                                                                                                                                                                                                                                                                                                                                         | UL 9540A: 2019 (Fourth Edition) Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems |                                                                                     |                                          |                                                                                                  |
| <b>Wareneingangsdatum:</b><br>Date of sample receipt:                                                                                                                                                                                                                                                                                                                                                                                                                | 2024-11-13                                                                                                                    |  |                                          |                                                                                                  |
| <b>Prüfmuster-Nr.:</b><br>Test sample no.:                                                                                                                                                                                                                                                                                                                                                                                                                           | #2024111301                                                                                                                   |                                                                                     |                                          |                                                                                                  |
| <b>Prüfzeitraum:</b><br>Testing period:                                                                                                                                                                                                                                                                                                                                                                                                                              | 2024-11-14 - 2024-11-22                                                                                                       |                                                                                     |                                          |                                                                                                  |
| <b>Ort der Prüfung:</b><br>Place of testing:                                                                                                                                                                                                                                                                                                                                                                                                                         | See page 5 Testing location                                                                                                   |                                                                                     |                                          |                                                                                                  |
| <b>Prüflaboratorium:</b><br>Testing laboratory:                                                                                                                                                                                                                                                                                                                                                                                                                      | TÜV Rheinland (Shanghai) Co., Ltd.                                                                                            |                                                                                     |                                          |                                                                                                  |
| <b>Prüfergebnis*:</b><br>Test result*:                                                                                                                                                                                                                                                                                                                                                                                                                               | See main report                                                                                                               |                                                                                     |                                          |                                                                                                  |
| <b>geprüft von:</b><br>tested by:                                                                                                                                                                                                                                                                                                                                                                                                                                    | Minhao Hu&Meng Jiang                                                                                                          |                                                                                     | <b>genehmigt von:</b><br>authorized by:  | Simon Wang                                                                                       |
| <b>Datum:</b><br>Date:                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2024-12-17 Minhao Hu Meng Jiang                                                                                               |                                                                                     | <b>Ausstellungsdatum:</b><br>Issue date: | 2024-12-17  |
| <b>Stellung / Position:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                          | Project Engineer/Trainee                                                                                                      |                                                                                     | <b>Stellung / Position:</b>              | Authorizer                                                                                       |
| <b>Sonstiges /</b><br>Other:                                                                                                                                                                                                                                                                                                                                                                                                                                         | N/A                                                                                                                           |                                                                                     |                                          |                                                                                                  |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br>Condition of the test item at delivery:                                                                                                                                                                                                                                                                                                                                                                      | Prüfmuster vollständig und unbeschädigt<br>Test item complete and undamaged                                                   |                                                                                     |                                          |                                                                                                  |
| * Legende:                                                                                                                                                                                                                                                                                                                                                                                                                                                           | P(ass) = entspricht o.g. Prüfgrundlage(n)                                                                                     | F(ail) = entspricht nicht o.g. Prüfgrundlage(n)                                     | N/A = nicht anwendbar                    | N/T = nicht getestet                                                                             |
| * Legend:                                                                                                                                                                                                                                                                                                                                                                                                                                                            | P(ass) = passed a.m. test specification(s)                                                                                    | F(ail) = failed a.m. test specification(s)                                          | N/A = not applicable                     | N/T = not tested                                                                                 |
| <b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b><br><i>This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i> |                                                                                                                               |                                                                                     |                                          |                                                                                                  |

Prüfbericht-Nr.: CN244Y4S 001  
Test report no.:

Seite 2 von 29  
Page 2 of 29

**Anmerkungen**  
*Remarks*

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.</p> <p>Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2 | <p>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie auf folgender Webseite: <a href="http://go.tuv.com/digital-signature">go.tuv.com/digital-signature</a></p> <p><i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following website: <a href="http://go.tuv.com/digital-signature">go.tuv.com/digital-signature</a></i></p> |
| 3 | <p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.</p> <p>Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i></p> <p><i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 4 | <p>Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.</p> <p><i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i></p>                                                                                                                                                                                                                                                                                       |

|                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>TEST REPORT</b><br><b>ANSI/CAN/UL 9540A:2019</b><br><b>Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems</b>                                                                                                                                                                                                                                     |                                                                                                                                      |
| <b>Report Number.....:</b> CN244Y4S 001<br><b>Date of issue.....:</b> See cover page<br><b>Total number of pages .....</b> See cover page                                                                                                                                                                                                                                                       |                                                                                                                                      |
| <b>Name of Testing Laboratory preparing the Report.....:</b>                                                                                                                                                                                                                                                                                                                                    | <b>TÜV Rheinland (Shanghai) Co., Ltd.</b><br>No. 177, Lane 777, West Guangzhong Road, Jing'an District, Shanghai 200072, P. R. China |
| <b>Applicant's name.....:</b><br><b>Address .....</b>                                                                                                                                                                                                                                                                                                                                           | <b>Pylon Technologies Co., Ltd.</b><br>No.300, Miaoqiao Road, Kangqiao Town, Pudong New Area, 201315 Shanghai, P.R. China            |
| <b>Test specification:</b><br><b>Standard .....</b> ANSI/CAN/UL 9540A:2019<br><b>Test procedure .....</b> TÜV Rheinland Test Report<br><b>Non-standard test method .....</b> N/A                                                                                                                                                                                                                |                                                                                                                                      |
| <b>Test Report Form No.....:</b> UL 9540A-C01<br><b>Test Report Form(s) Originator .....</b> TÜV Rheinland (Shanghai) Co., Ltd.<br><b>Master TRF .....</b> Dated 2023-12-25                                                                                                                                                                                                                     |                                                                                                                                      |
| <b>General disclaimer:</b><br>The test results presented in this report relate only to the object tested.<br>This report shall not be reproduced, except in full, without the written approval of the Issuing Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the TÜV Rheinland (Shanghai) Co., Ltd., responsible for this Test Report. |                                                                                                                                      |
| <b>Other / Scope:</b><br>This report presents the result of module level tests of UL 9540A: 2019.<br>All tests were conducted at TUV Rheinland (Shanghai) Co., Ltd. and TUV Rheinland's partner labs that were under supervision of TÜV Rheinland's engineer.<br>All tests were under supervision of TÜV Rheinland's engineer.                                                                  |                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                      |

**List of Attachments:**

**Attachment A:** Module Conditioning (Charge/Discharge) Profiles

**Attachment B:** Observations and Records

**Attachment C:** Module and Initiating Cell(s) Temperature Profiles During Testing

**Attachment D:** Module Chemical Heat Release Rate and Smoke Release Rate

**Attachment E:** Flammable Gas Generation and Composition Data

**Attachment F:** Sample Photos and Test Photos

**Attachment G:** List of Test and Measurement Instruments

**Summary of testing:**

|                                                    |                                                                               |
|----------------------------------------------------|-------------------------------------------------------------------------------|
| Model No:                                          | HM7A200L                                                                      |
| Ratings:                                           | 166.4V, 52.249kWh                                                             |
| Cells in series/parallel:                          | 1P52S                                                                         |
| Module dimensions:                                 | 1145±5mm(L)×790±5mm(W)×245±5mm(H)                                             |
| Module weight:                                     | 336±5kg                                                                       |
| Module enclosure material:                         | Nonmetallic enclosure                                                         |
| Total number of cell(s) went into thermal runaway: | 2                                                                             |
| Thermal Runaway and Propagation:                   | 1 initiating cell went into thermal runaway and propagated to 1 adjacent cell |
| Maximum Smoke Release Rate:                        | 2.979 m <sup>2</sup> /s                                                       |
| Total Smoke Released:                              | 220.316 m <sup>2</sup>                                                        |
| Total smoke released duration                      | 14:10 to 18:10                                                                |
| Peak Chemical Heat Release Rate: (kW):             | No flaming occurred                                                           |
| External Flaming:                                  | No external flaming occurred                                                  |
| Location(s) of Flame Venting:                      | No flaming occurred                                                           |
| Flying Debris:                                     | No flying debris occurred                                                     |
| Re-ignitions:                                      | No further re-ignitions were observed during post test observation            |

**Summary of Module level test Gas Analysis Data:**

Gas Analysis:

|                                                                  |                                     |
|------------------------------------------------------------------|-------------------------------------|
| Flame ionization detection                                       | <input checked="" type="checkbox"/> |
| Fourier-Transform infrared Spectrometer                          | <input checked="" type="checkbox"/> |
| Hydrogen Sensor (palladium-nickel, thin-film solid state sensor) | <input checked="" type="checkbox"/> |
| White light source with photo detector (smoke release rate)      | <input checked="" type="checkbox"/> |

**Gas Composition & Volume for Each Compound (Pre-flaming and Post-Flaming):**

| Gas Compound                            | Gas Type          | Pre-Flaming (L) | Post-Flaming (L) |
|-----------------------------------------|-------------------|-----------------|------------------|
| Total Hydrocarbons (Propane Equivalent) | Hydrocarbons      | 67.31           | No flaming       |
| Carbon Monoxide                         | Carbon Containing | 10.43           | No flaming       |
| Carbon Dioxide                          | Carbon Containing | 120.74          | No flaming       |
| Hydrogen                                | Hydrogen          | 60.12           | No flaming       |

Note: 1) The collection time is from 14:10 to 18:10.

2) See attachment E for detail gas analysis data.

**Result of testing:**

Performance Criteria in accordance with Clause 8.4 and Figure 1.1:

|                                                                  |                                     |
|------------------------------------------------------------------|-------------------------------------|
| The effect of thermal runaway was contained by the module design | <input checked="" type="checkbox"/> |
| Cell vent gas (based upon the cell level test) was non-flammable | <input type="checkbox"/>            |

Necessity of a unit level test

|                                                                                                                                                                                                                                                                         |                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| The performance criteria of the module level test as indicated in 8.4 and as shown in Figure 1.1 of UL 9540A 4th edition has not been met, therefore unit level testing in accordance with UL 9540A will need to be conducted on a complete unit employing this module. | <input checked="" type="checkbox"/> |
| The performance criteria of the module level test as indicated in 8.4 and as shown in Figure 1.1 of UL 9540A 4th edition has been met, therefore unit level testing in accordance with UL 9540A need not be conducted.                                                  | <input type="checkbox"/>            |

**Tests performed (name of test and test clause):**

UL 9540A cl 8. Module Level

**Testing location:**

HangZhou ZhongChuan Fire Quitpmnt Co., Ltd.  
No.8, Village 006, Quantou Village, Lankao County,  
Kaifeng city, Henan Province

**Possible test case verdicts:**

- 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)

**Testing:**

Date of receipt of test item ..... : 2024-11-13

Date (s) of performance of tests..... : 2024-11-14 to 2024-11-22

**General remarks:**

"(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 (ies) .....** : Pylon Technologies Co., Ltd.  
No.300, Miaoqiao Road, Kangqiao Town, Pudong New  
Area, 201315 Shanghai, P.R. China

**Other:**

N/A

**UL 9540A testing information :**

| Cell level information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                       |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--|-----------------------|-----------------|----|--------|----------------|-----------------|--------|----------|----------------|--------|---------|-----------------|-------|--------|-------------------------------|-------|----------|-------------------------------|-------|---------|-------------------------------|-------|-----------|-------------------------------|-------|-----------|--------------------------------|-------|-----------|-------------------------------|-------|--------|--------------------------------|-------|
| Manufacturer :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Jiangsu Pylon Battery Co., Ltd.                                                                                                       |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Model number :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | L173F314                                                                                                                              |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Chemistry :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | LiFePO <sub>4</sub>                                                                                                                   |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Physical configuration :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Prismatic                                                                                                                             |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Electrical rating :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Rated capacity: 314 Ah                                                                                                                |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Nominal voltage: 3.2 V                                                                                                                |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Compliance with UL1973..... :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> Yes <u>Report No. MH64541-20241128</u><br><u>Cert. No. MH64541</u><br><input type="checkbox"/> No |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| UL 9540A cell test report number ..... :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 80232266                                                                                                                              |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Average cell surface temperature at gas venting :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 140.5 °C                                                                                                                              |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Average cell surface temperature at thermal runaway :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 210.6 °C                                                                                                                              |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Gas Volume:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 192.0 L                                                                                                                               |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Lower flammability limit (LFL), % volume in air at the ambient temperature:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 6.2%                                                                                                                                  |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Lower flammability limits (LFL), % volume in air at the venting temperature:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5.6%                                                                                                                                  |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Burning velocity (Su):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 63.8 cm/s                                                                                                                             |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Maximum pressure (Pmax):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.68 MPa                                                                                                                              |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Cell level Gas Composition:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                       |                       |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| <table border="1"> <thead> <tr> <th colspan="2">Gas component</th> <th>Concentration % (v/v)</th> </tr> </thead> <tbody> <tr> <td>Carbon monoxide</td> <td>CO</td> <td>13.924</td> </tr> <tr> <td>Carbon dioxide</td> <td>CO<sub>2</sub></td> <td>27.237</td> </tr> <tr> <td>Hydrogen</td> <td>H<sub>2</sub></td> <td>44.925</td> </tr> <tr> <td>Methane</td> <td>CH<sub>4</sub></td> <td>6.421</td> </tr> <tr> <td>Ethane</td> <td>C<sub>2</sub>H<sub>6</sub></td> <td>0.996</td> </tr> <tr> <td>Ethylene</td> <td>C<sub>2</sub>H<sub>4</sub></td> <td>3.827</td> </tr> <tr> <td>Propane</td> <td>C<sub>3</sub>H<sub>8</sub></td> <td>0.322</td> </tr> <tr> <td>Propylene</td> <td>C<sub>3</sub>H<sub>6</sub></td> <td>1.227</td> </tr> <tr> <td>Isobutane</td> <td>C<sub>4</sub>H<sub>10</sub></td> <td>0.013</td> </tr> <tr> <td>Acetylene</td> <td>C<sub>2</sub>H<sub>2</sub></td> <td>0.339</td> </tr> <tr> <td>Butane</td> <td>C<sub>4</sub>H<sub>10</sub></td> <td>0.091</td> </tr> </tbody> </table> |                                                                                                                                       | Gas component         |  | Concentration % (v/v) | Carbon monoxide | CO | 13.924 | Carbon dioxide | CO <sub>2</sub> | 27.237 | Hydrogen | H <sub>2</sub> | 44.925 | Methane | CH <sub>4</sub> | 6.421 | Ethane | C <sub>2</sub> H <sub>6</sub> | 0.996 | Ethylene | C <sub>2</sub> H <sub>4</sub> | 3.827 | Propane | C <sub>3</sub> H <sub>8</sub> | 0.322 | Propylene | C <sub>3</sub> H <sub>6</sub> | 1.227 | Isobutane | C <sub>4</sub> H <sub>10</sub> | 0.013 | Acetylene | C <sub>2</sub> H <sub>2</sub> | 0.339 | Butane | C <sub>4</sub> H <sub>10</sub> | 0.091 |
| Gas component                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                       | Concentration % (v/v) |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Carbon monoxide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CO                                                                                                                                    | 13.924                |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Carbon dioxide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CO <sub>2</sub>                                                                                                                       | 27.237                |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Hydrogen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | H <sub>2</sub>                                                                                                                        | 44.925                |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Methane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CH <sub>4</sub>                                                                                                                       | 6.421                 |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Ethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | C <sub>2</sub> H <sub>6</sub>                                                                                                         | 0.996                 |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Ethylene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | C <sub>2</sub> H <sub>4</sub>                                                                                                         | 3.827                 |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Propane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | C <sub>3</sub> H <sub>8</sub>                                                                                                         | 0.322                 |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Propylene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | C <sub>3</sub> H <sub>6</sub>                                                                                                         | 1.227                 |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Isobutane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | C <sub>4</sub> H <sub>10</sub>                                                                                                        | 0.013                 |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Acetylene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | C <sub>2</sub> H <sub>2</sub>                                                                                                         | 0.339                 |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |
| Butane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | C <sub>4</sub> H <sub>10</sub>                                                                                                        | 0.091                 |  |                       |                 |    |        |                |                 |        |          |                |        |         |                 |       |        |                               |       |          |                               |       |         |                               |       |           |                               |       |           |                                |       |           |                               |       |        |                                |       |

|                        |                                |       |
|------------------------|--------------------------------|-------|
| Isobutene              | C <sub>4</sub> H <sub>8</sub>  | 0.085 |
| Trans butene           | C <sub>4</sub> H <sub>8</sub>  | 0.322 |
| n-Butene               | C <sub>4</sub> H <sub>8</sub>  | 0.140 |
| Isopentane             | C <sub>5</sub> H <sub>12</sub> | 0.007 |
| Pentane                | C <sub>5</sub> H <sub>12</sub> | 0.110 |
| 2-methyl-1,3-butadiene | C <sub>5</sub> H <sub>8</sub>  | 0.014 |
| Total                  |                                | 100   |

### General product information

Photo of module:

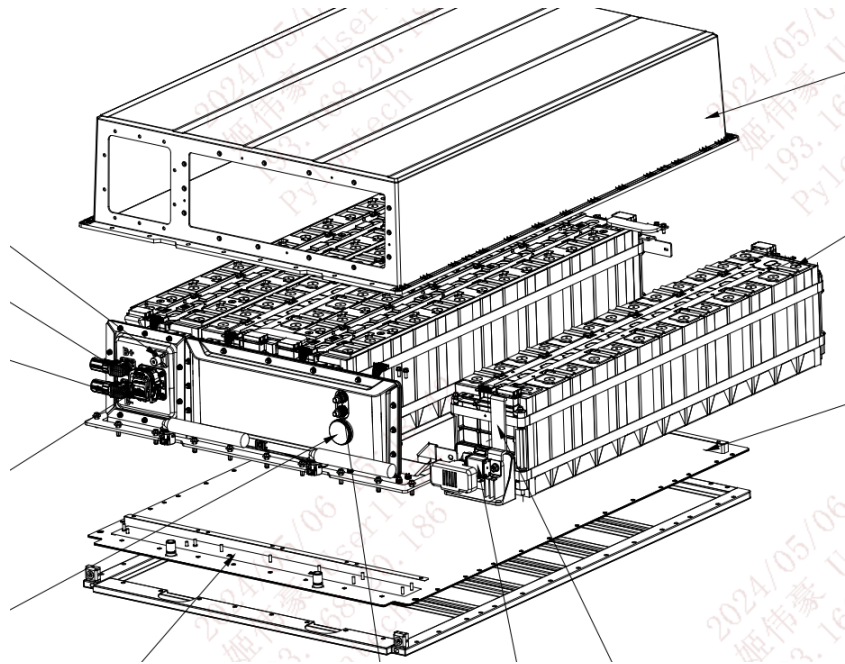


|                                 |                            |                                   |
|---------------------------------|----------------------------|-----------------------------------|
| Manufacturer name :             |                            | Pylon Technologies Co., Ltd.      |
| Model number :                  |                            | HM7A200L                          |
| Physical configuration :        |                            | Nonmetallic enclosure             |
|                                 |                            | Weight: 336±5kg                   |
|                                 |                            | Cells in series/parallel: 1P52S   |
| Cooling method :                |                            | Liquid cooling                    |
| Electrical rating :             |                            | Rated capacity: 314 Ah            |
|                                 |                            | Nominal voltage: 166.4V           |
| Standard charge method .....    | Charge power :             | 26.1 kW                           |
|                                 | End of charge voltage :    | 187.2 V                           |
| Standard discharge method ..... | Discharge power :          | 26.1 kW                           |
|                                 | End of discharge voltage : | 135.2 V                           |
| External dimensions:            |                            | 1145±5mm(L)×790±5mm(W)×245±5mm(H) |



## Module Construction

Figure 1. Layout of the module contents



## Diagrams of setup for module level testing

Figure 2. Thermocouples (no. xx) locations of initiating cell

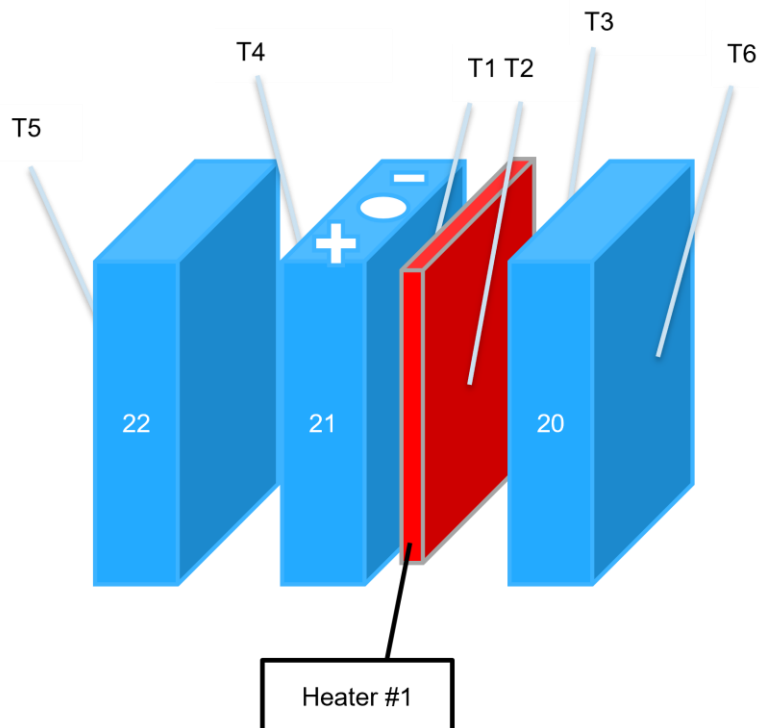


Figure 3. Cell numbering, heater location and thermocouples (no. xx) locations inside the sub-module

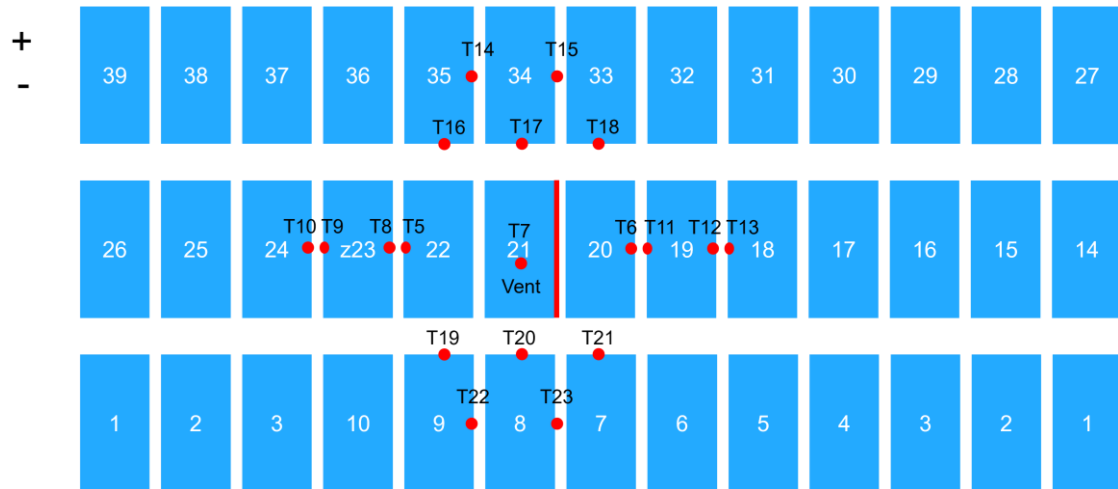
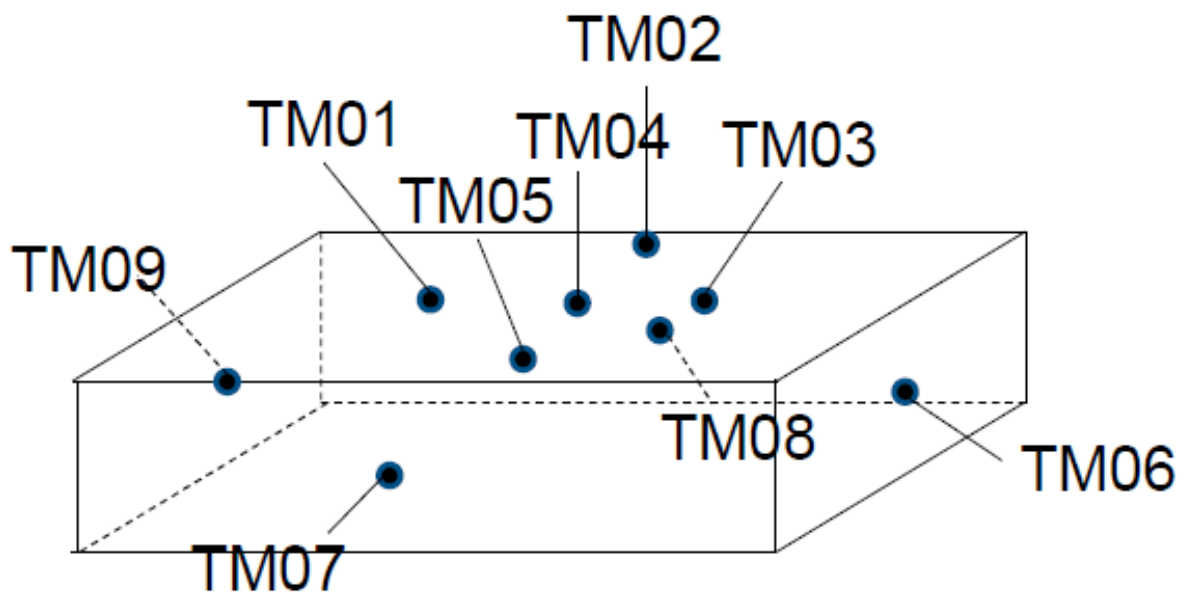


Figure 4. Thermocouples' locations outside module



| ANSI/CAN/UL 9540A:2019 |                                                                                                                                                                                                                                                                                                                                                                    |                                                    |         |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------|
| Clause                 | Requirement + Test                                                                                                                                                                                                                                                                                                                                                 | Result - Remark                                    | Verdict |
| <b>CONSTRUCTION</b>    |                                                                                                                                                                                                                                                                                                                                                                    |                                                    | --      |
| <b>5</b>               | <b>General</b>                                                                                                                                                                                                                                                                                                                                                     |                                                    | --      |
| <b>5.1</b>             | <b>Cell</b>                                                                                                                                                                                                                                                                                                                                                        |                                                    | P       |
| 5.1.1                  | The cells associated with the BESS that were tested shall be documented in the test report                                                                                                                                                                                                                                                                         | Accepted test report by CSA, test report: 80232266 | P       |
| 5.1.2                  | The cell documentation included in the test report shall indicate if the cells associated with the BESS comply with UL 1973                                                                                                                                                                                                                                        |                                                    | P       |
| 5.1.3                  | Refer to 7.6.1 for further details                                                                                                                                                                                                                                                                                                                                 |                                                    | N/A     |
| <b>5.2</b>             | <b>Module</b>                                                                                                                                                                                                                                                                                                                                                      |                                                    | P       |
| 5.2.1                  | The modules associated with the BESS that were tested shall be documented in the test report                                                                                                                                                                                                                                                                       | See Product Specification on Page 8                | P       |
| 5.2.2                  | The module documentation included in the test report shall indicate if the modules associated with the BESS comply with UL 1973                                                                                                                                                                                                                                    | Test with unit                                     | N/A     |
| 5.2.3                  | Refer to 8.3 for further details                                                                                                                                                                                                                                                                                                                                   | See 8.3                                            | P       |
| <b>5.3</b>             | <b>Battery energy storage system unit</b>                                                                                                                                                                                                                                                                                                                          | Not applicable for module level product.           | N/A     |
| 5.3.1                  | The BESS unit documentation included in the test report shall indicate the units that comply with UL 9540                                                                                                                                                                                                                                                          |                                                    | N/A     |
| 5.3.2                  | For BESS units for which UL 9540 compliance cannot be determined,                                                                                                                                                                                                                                                                                                  |                                                    | N/A     |
| 5.3.3                  | If applicable, the details of any fire detection and suppression systems that are an integral part of the BESS shall be noted in the test report                                                                                                                                                                                                                   |                                                    | N/A     |
| 5.3.4                  | Refer to 9.7, 10.4 and 10.7 for further details                                                                                                                                                                                                                                                                                                                    |                                                    | N/A     |
| <b>5.4</b>             | <b>Flow Batteries</b>                                                                                                                                                                                                                                                                                                                                              | Not applicable for lithium product.                | N/A     |
| 5.4.1                  | For flow batteries, the report will cover the chemistry, as well as the electrical rating in capacity and nominal voltage of the cell stack                                                                                                                                                                                                                        |                                                    | N/A     |
| 5.4.2                  | The flow battery documentation included in the test report shall indicate if the flow battery system complies with UL 1973                                                                                                                                                                                                                                         |                                                    | N/A     |
| 5.4.3                  | See 7.6.2 for further details                                                                                                                                                                                                                                                                                                                                      |                                                    | N/A     |
| <b>PERFORMANCE</b>     |                                                                                                                                                                                                                                                                                                                                                                    |                                                    | --      |
| <b>6</b>               | <b>General</b>                                                                                                                                                                                                                                                                                                                                                     |                                                    | --      |
| 6.1                    | The tests in this standard are extreme abuse conditions conducted on electrochemical energy storage devices that can result in fires, explosions, smoke, off gassing of flammable and toxic materials, exposure to toxic and corrosive liquids, and potential exposure to hazardous voltages and electrical energy. See Annex B for recommended testing practices. |                                                    | P       |

| ANSI/CAN/UL 9540A:2019 |                                                                                                                                                                                                                                                                                                                                                |                                                          |         |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------|
| Clause                 | Requirement + Test                                                                                                                                                                                                                                                                                                                             | Result - Remark                                          | Verdict |
| 6.2                    | At the conclusion of testing, samples shall be discharged in accordance with the manufacturer's specifications                                                                                                                                                                                                                                 |                                                          | P       |
| <b>8</b>               | <b>Module Level</b>                                                                                                                                                                                                                                                                                                                            |                                                          | --      |
| <b>8.1</b>             | <b>Sample</b>                                                                                                                                                                                                                                                                                                                                  |                                                          | P       |
| 8.1.1                  | Module samples shall be conditioned, prior to testing, through charge and discharge cycles for a minimum of 2 cycles, using a manufacturer specified methodology                                                                                                                                                                               | See Attachment A for profiles                            | P       |
| 8.1.2                  | The module to be tested shall be charged to 100% SOC and allowed to rest a maximum of 8 h before the start of the test                                                                                                                                                                                                                         | Stabilized for 4 hours                                   | P       |
| 8.1.3                  | Electronics and software controls such as the battery management system (BMS) are not relied upon for this testing.                                                                                                                                                                                                                            | Module BMS constructed but not operated during the test. | P       |
| <b>8.2</b>             | <b>Test method</b>                                                                                                                                                                                                                                                                                                                             |                                                          | P       |
| 8.2.1                  | Ambient indoor laboratory conditions shall be 25 ±5°C (77 ±9°F) and 50 ±25% RH at the initiation of the test.                                                                                                                                                                                                                                  | See Attachment B                                         | P       |
| 8.2.2                  | The test shall be conducted under a smoke collection hood                                                                                                                                                                                                                                                                                      | Smoke collection hood used                               | P       |
| 8.2.3                  | The weight of the module shall be recorded before and after testing                                                                                                                                                                                                                                                                            | See Attachment B                                         | P       |
| 8.2.4                  | The number of cells within the module that are forced into thermal runaway can be one or multiple cells                                                                                                                                                                                                                                        | See Figure 2<br>One cell forced into thermal runaway     | P       |
| 8.2.5                  | The methodology used for initiating thermal runaway pursuant to 7.2 shall be used                                                                                                                                                                                                                                                              | One external film heater used                            | P       |
| 8.2.6                  | With reference to 8.2.5, occurrence of thermal runaway shall be verified by sustained temperature above the cell surface temperature                                                                                                                                                                                                           |                                                          | P       |
| 8.2.7                  | The module shall be placed on top of a noncombustible horizontal surface                                                                                                                                                                                                                                                                       |                                                          | P       |
| 8.2.8                  | The chemical heat release rate of the module in thermal runaway shall be measured with oxygen consumption calorimetry.                                                                                                                                                                                                                         |                                                          | P       |
| 8.2.9                  | The chemical heat release rate shall be measured for the duration of the test. See 8.2.10.                                                                                                                                                                                                                                                     |                                                          | P       |
| 8.2.10                 | The chemical heat release rate shall be measured by a measurement system consisting of a paramagnetic oxygen analyzer                                                                                                                                                                                                                          |                                                          | P       |
| 8.2.11                 | With reference to 8.2.10, calculate the chemical heat release rate at each of the flows as follows:<br>$HRR_1 = \left[ E \times \phi - (E_{co} - E) \times \frac{1 - \phi}{2} \times \frac{X_{co}}{X_{O_2}} \right] \times \frac{\dot{m}_e}{1 + \phi \times (\alpha - 1)} \times \frac{M_{O_2}}{M_a} \times (1 - X_{H_2O}^o) \times X_{O_2}^o$ |                                                          | P       |
| 8.2.12                 | Vent gas composition shall be measured using a Fourier-Transform Infrared Spectrometer or equivalent gas analyzer                                                                                                                                                                                                                              |                                                          | P       |

| ANSI/CAN/UL 9540A:2019 |                                                                                                                                                                              |                                                        |         |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|---------|
| Clause                 | Requirement + Test                                                                                                                                                           | Result - Remark                                        | Verdict |
| 8.2.13                 | The hydrocarbon content of the vent gas shall be measure using flame ionization detection                                                                                    |                                                        | P       |
| 8.2.14                 | The light transmission in the exhaust duct of the heat release rate calorimeter shall be measured using a white light source and photo detector for the duration of the test |                                                        | P       |
| 8.2.15                 | Smoke release rate shall be calculated as follows:<br>$SRR = 2.303 \left( \frac{V}{D} \right) \log_{10} \left( \frac{I_o}{I} \right)$                                        |                                                        | P       |
| <b>8.3</b>             | <b>Module level test report</b>                                                                                                                                              |                                                        | P       |
| 8.3.1                  | The report on module level testing shall include the following:                                                                                                              |                                                        | P       |
|                        | a) Module manufacturer and model number;<br>b) Number of cells in module;<br>c) Module configuration;                                                                        | See Test Item Description in beginning of this report. | P       |
|                        | d) Module construction features;                                                                                                                                             | See Page 9<br>Module Construction                      | P       |
|                        | e) Module voltage corresponding to the tested SOC;                                                                                                                           | See Attachment B                                       | P       |
|                        | f) Thermal runaway initiation method used;                                                                                                                                   | See Figure 2                                           | P       |
|                        | g) Heat release rate versus time data;                                                                                                                                       | See Attachment D                                       | P       |
|                        | h) Flammable gas generation and composition data;                                                                                                                            | See Attachment E                                       | P       |
|                        | i) Peak smoke release rate and total smoke release data.                                                                                                                     | See Attachment D                                       | P       |
|                        | j) Observation(s) of flying debris or explosive                                                                                                                              | See Attachment B                                       | P       |
|                        | k) Observation(s) of sparks, electrical arcs, or other electrical events;                                                                                                    | See Attachment B                                       | P       |
|                        | l) Identification/location of cells(s) that exhibited thermal runaway within the module;                                                                                     | See Figure 2                                           | P       |
|                        | m) Locations and visual estimations of flame extension and duration from the module shall be documented;                                                                     | See Attachment B                                       | P       |
|                        | n) Module weight loss based on measurements per 8.2.3; and                                                                                                                   | See Attachment B                                       | P       |
|                        | o) Video of the test.                                                                                                                                                        | Recorded                                               | P       |
| <b>8.4</b>             | <b>Performance at module level testing</b>                                                                                                                                   |                                                        | N/A     |
| 8.4.1                  | Unit level testing in Section 9 is not required if the following performance conditions are met during the module level test:                                                | Unit level testing required.                           | N/A     |
|                        | a) Thermal runaway is contained by module design; and                                                                                                                        |                                                        | P       |
|                        | b) Cell vent gas is nonflammable as determined by the cell level test.                                                                                                       | See test report by CSA, test report: 80232266          | F       |

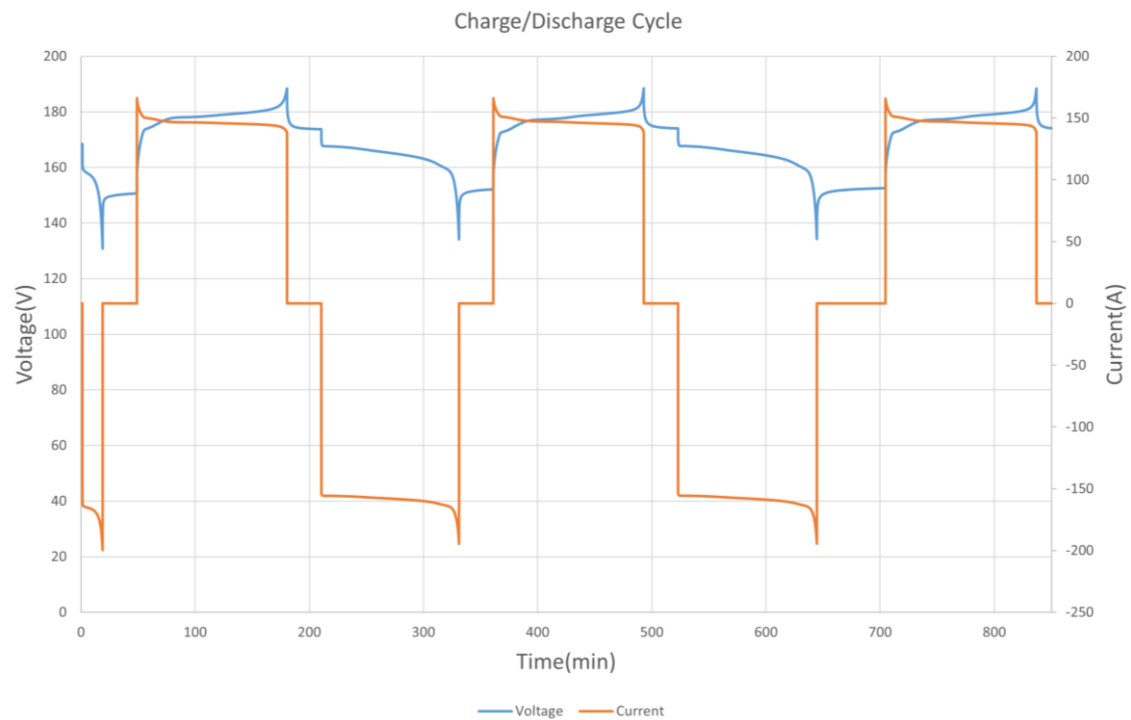
## Attachment A Module Conditioning (Charge/Discharge) Profiles

Module sample was conditioned, prior to testing, through charge and discharge cycles of 2 cycles to verify that the module was functional.

Each cycle was defined as a charge to 100% SOC and allowed to rest several minutes and then discharged to an end of discharge voltage (EODV) determined by the manufacturer. Refer to the General Product Information mentioned above for charge and discharge profile.

The module sample was put in a climate chamber during charge and discharge. The ambient is kept at  $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and  $50\% \pm 5\%$  R.H.

Figure 5. Module charge and discharge voltage/current profiles



## Attachment B Observations and Records

| Test initiation details                             |                            |
|-----------------------------------------------------|----------------------------|
| Ambient conditions at the initiation of the test. : | 20.5°C, 47.9% R.H.         |
| Sample number .....                                 | #2024111301                |
| Open circuit voltage before test (V) .....          | 172.6                      |
| Weight before test (kg).....                        | 337.0 (with thermocouples) |
| Open circuit voltage after test (V) .....           | 166.1                      |
| Weight after test (kg) .....                        | 334.5 (with thermocouples) |
| Weight loss (kg).....                               | 2.5                        |

| Test overview timeline                                                                                                                                                                     |                 |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------|
| Locations (Cell #)                                                                                                                                                                         | Event           | Time  |
| -                                                                                                                                                                                          | Test start      | 14:17 |
| 21                                                                                                                                                                                         | Vent            | 15:14 |
| 21                                                                                                                                                                                         | Thermal runaway | 15:14 |
| 20                                                                                                                                                                                         | Vent            | 15:18 |
| 22                                                                                                                                                                                         | Vent            | 15:31 |
| 20                                                                                                                                                                                         | Thermal runaway | 16:15 |
| Note:<br><br>1) No flying debris or explosive discharge of gases during test.<br><br>2) No sparks, electrical arcs, or other electrical events during test.<br><br>3) No flaming observed. |                 |       |

## Attachment C Module and Initiating Cell(s) Temperature Profiles During Testing

Figure 6. Temperatures of cell #20- #22

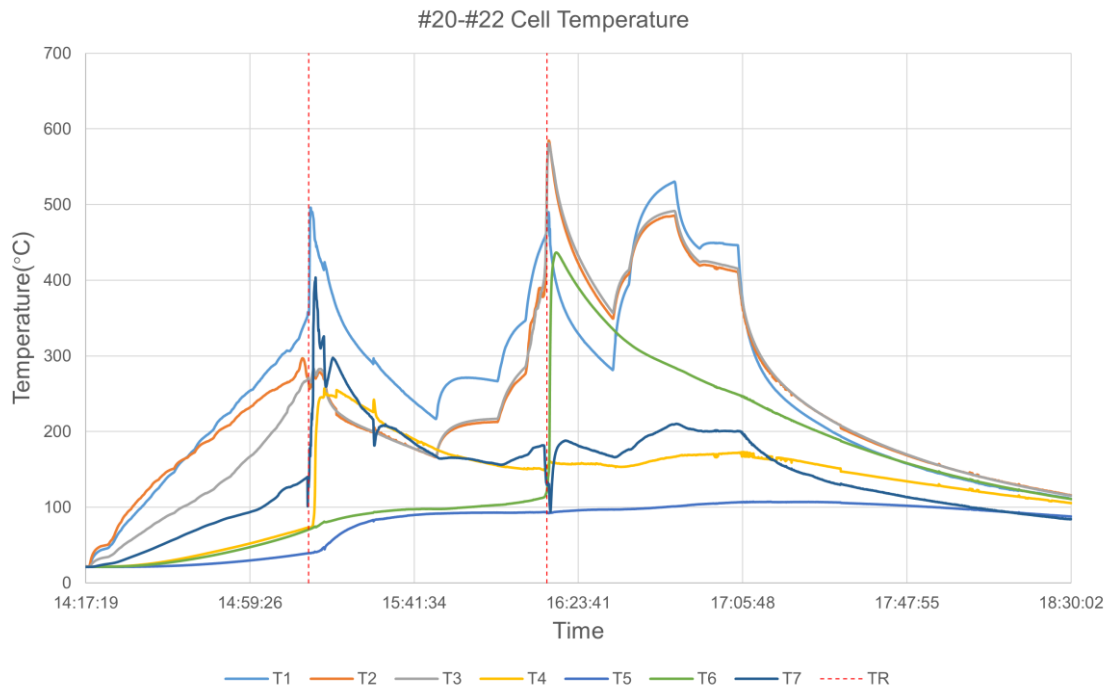


Figure 7. Temperatures of cell #18-#19 and #23- #24

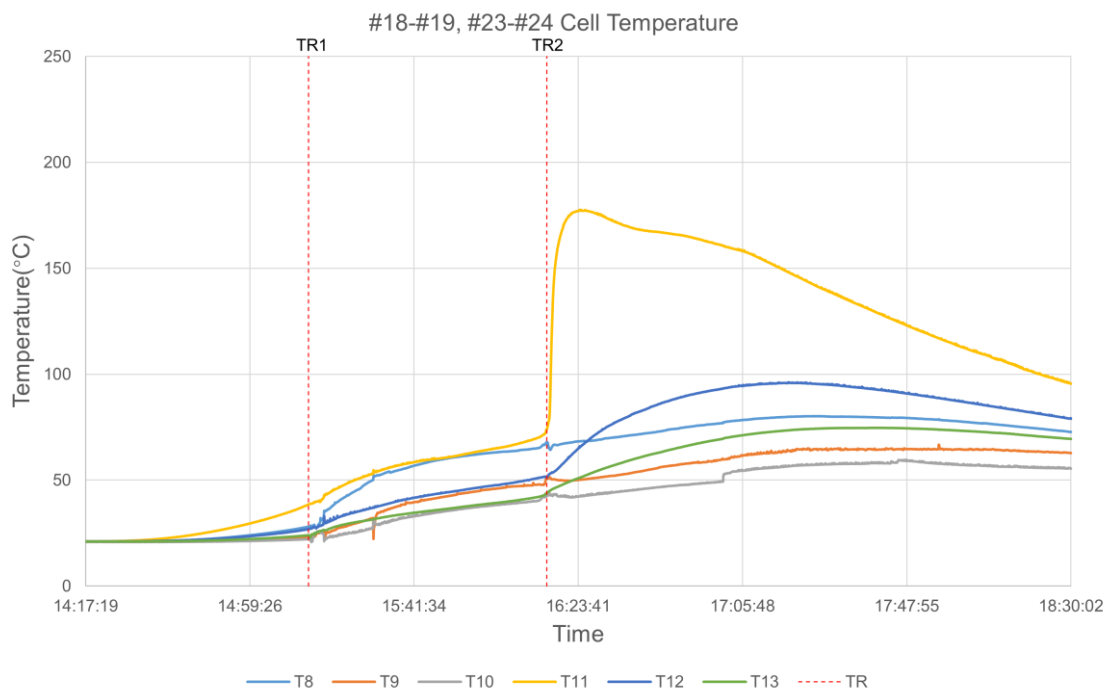




Figure 8. Temperatures of cell #7- #9

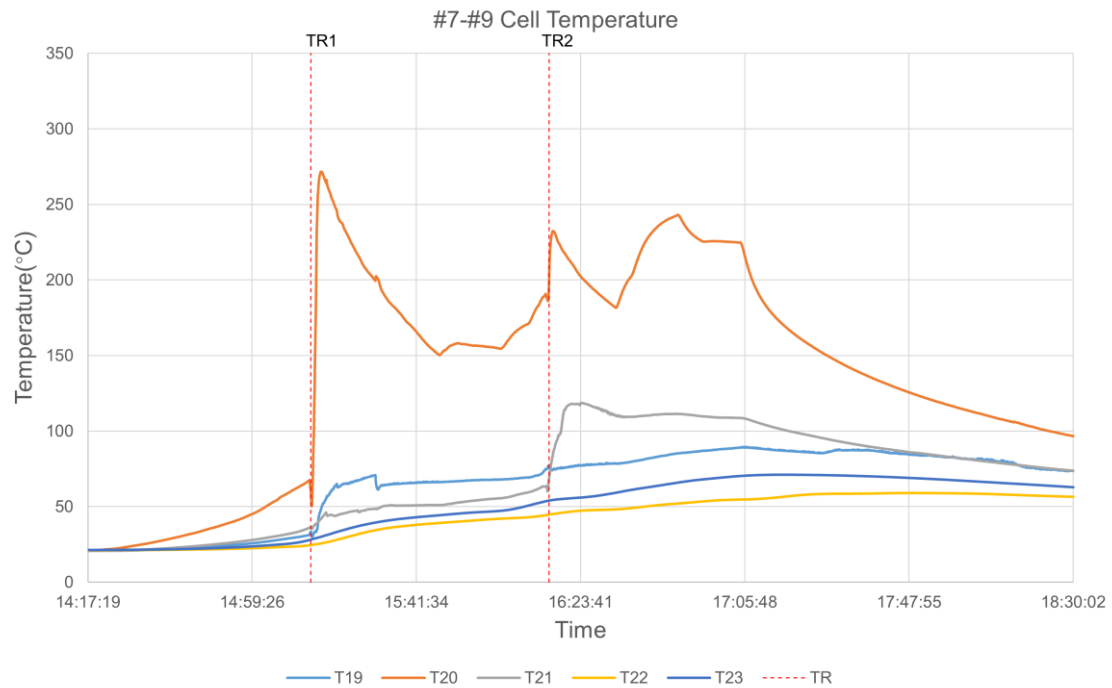


Figure 9. Temperatures of cell #33- #35

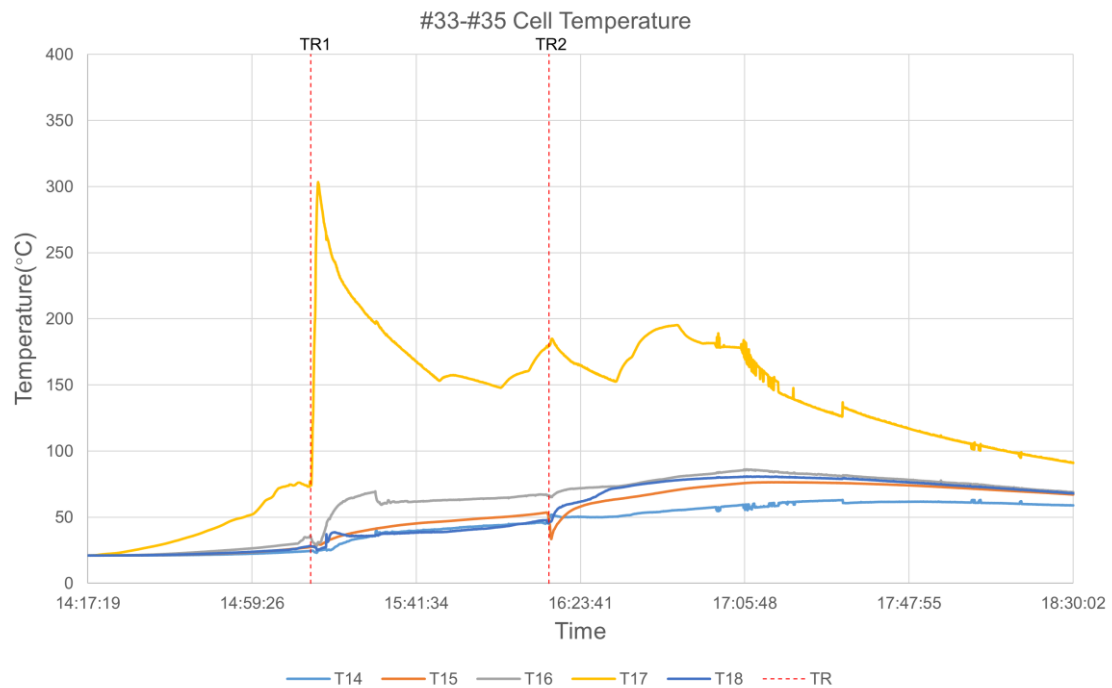


Figure 10. Temperatures of module surface

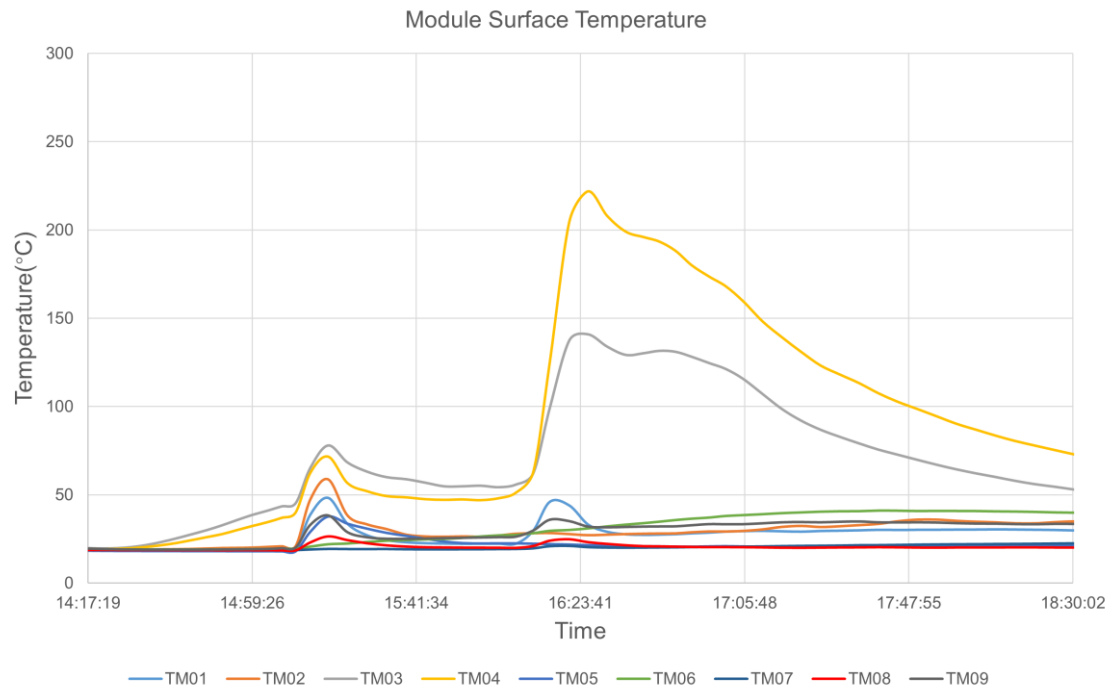
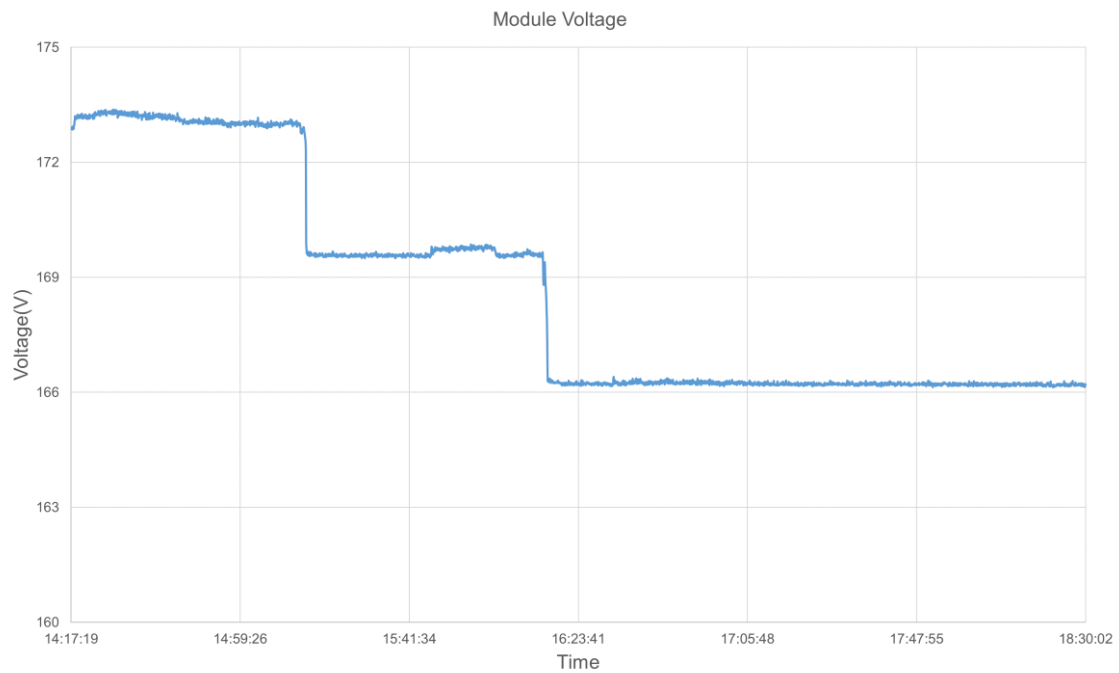


Figure 11. Module Voltage



## Attachment D Module Chemical Heat Release Rate and Smoke Release Rate

| Smoke and heat release rate |                                       |                     |
|-----------------------------|---------------------------------------|---------------------|
| Smoke Release Rate (SRR)    | Maximum SRR(m <sup>2</sup> /s)        | 2.979               |
|                             | Total Smoke Released(m <sup>2</sup> ) | 220.316             |
| Heat Release Rate (HRR)     | Peak Chemical HRR(kW)                 | No flaming observed |
|                             | Total Heat Release(MJ)                | No flaming observed |

Figure 12. SRR curve

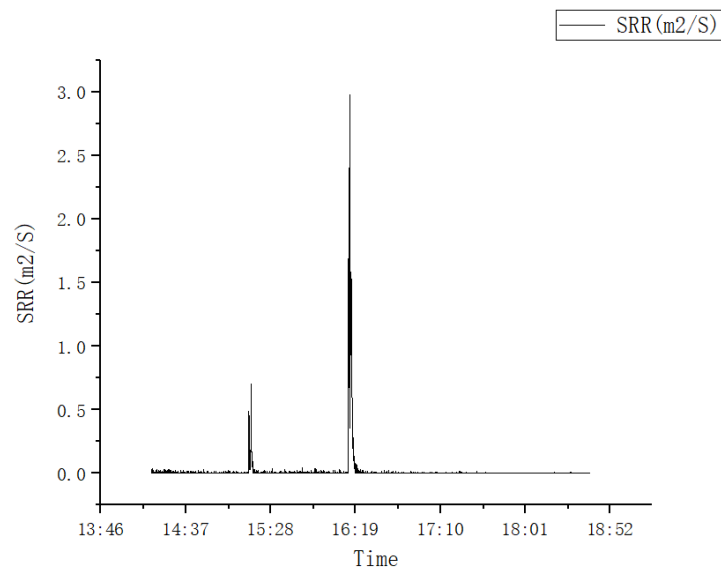
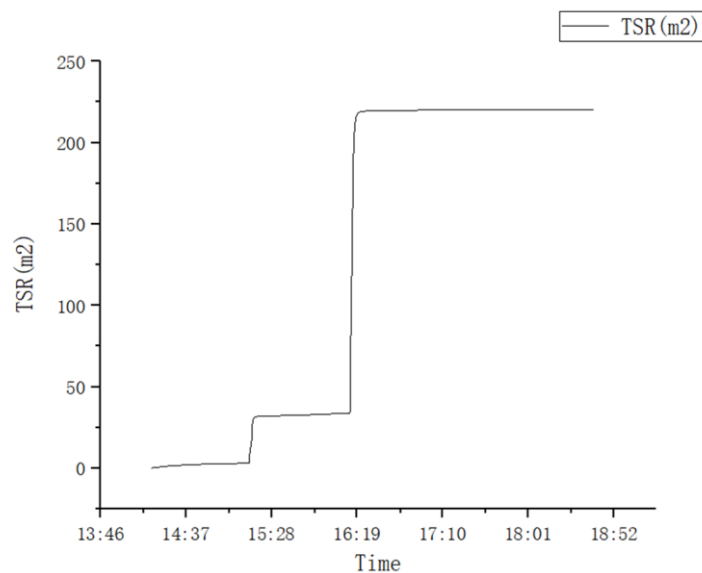


Figure 13. TSR curve



## Attachment E Flammable Gas Generation and Composition Data

| Measurement Method                                      | Gas Compound                            | Gas Type          | Pre-Flaming (L) | Post-Flaming (L) |
|---------------------------------------------------------|-----------------------------------------|-------------------|-----------------|------------------|
| Flame ionization detection                              | Total Hydrocarbons (Propane Equivalent) | Hydrocarbons      | 67.31           | No flaming       |
| Fourier-Transform infrared Spectrometer                 | Carbon Monoxide                         | Carbon Containing | 10.43           | No flaming       |
|                                                         | Carbon Dioxide                          | Carbon Containing | 120.74          | No flaming       |
| Solid-state Hydrogen Sensor                             | Hydrogen                                | Hydrogen          | 60.12           | No flaming       |
| Note:<br>1) The collection time is from 14:10 to 18:10. |                                         |                   |                 |                  |

| Measurement Method                                      | Gas components |                               | Total volume of gas (L) |              |
|---------------------------------------------------------|----------------|-------------------------------|-------------------------|--------------|
|                                                         |                |                               | Pre-Flaming             | Post-Flaming |
| Fourier-Transform infrared Spectrometer                 | Methane        | CH <sub>4</sub>               | 41.07                   | No flaming   |
|                                                         | Ethylene       | C <sub>2</sub> H <sub>4</sub> | 15.75                   | No flaming   |
| Note:<br>1) The collection time is from 14:10 to 18:10. |                |                               |                         |              |

Figure 14. Total Hydrocarbons

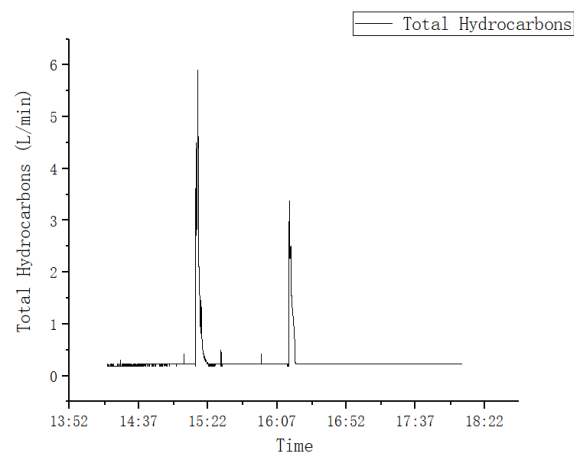
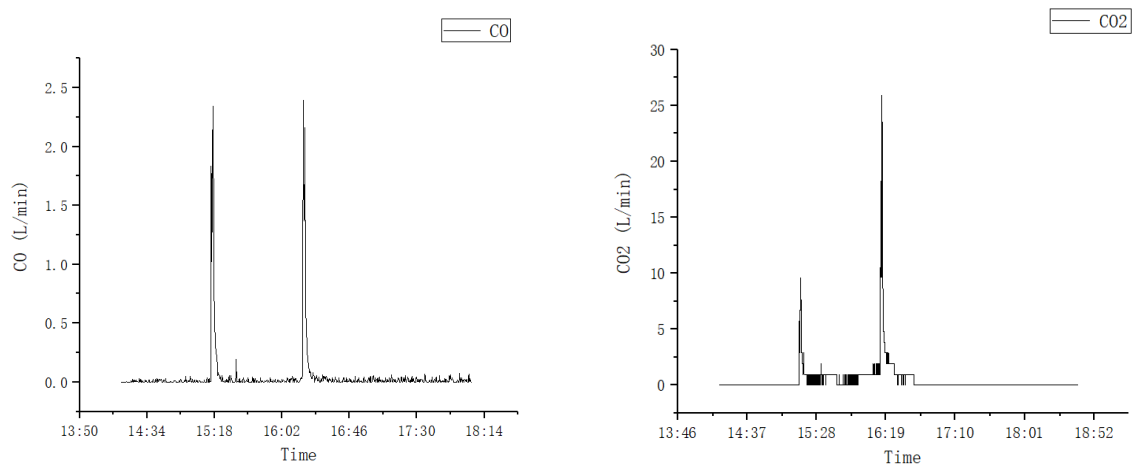

Figure 15. CO, CO<sub>2</sub>


Figure 16. Hydrogen

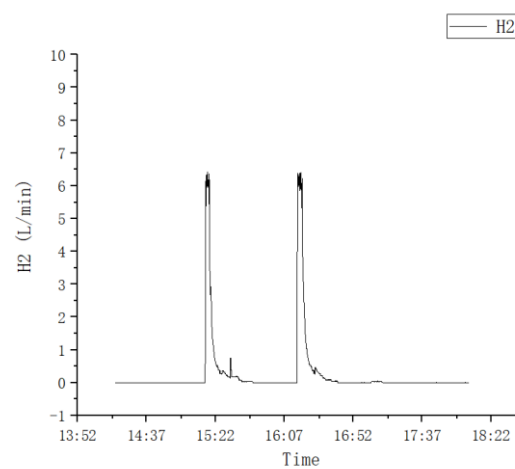
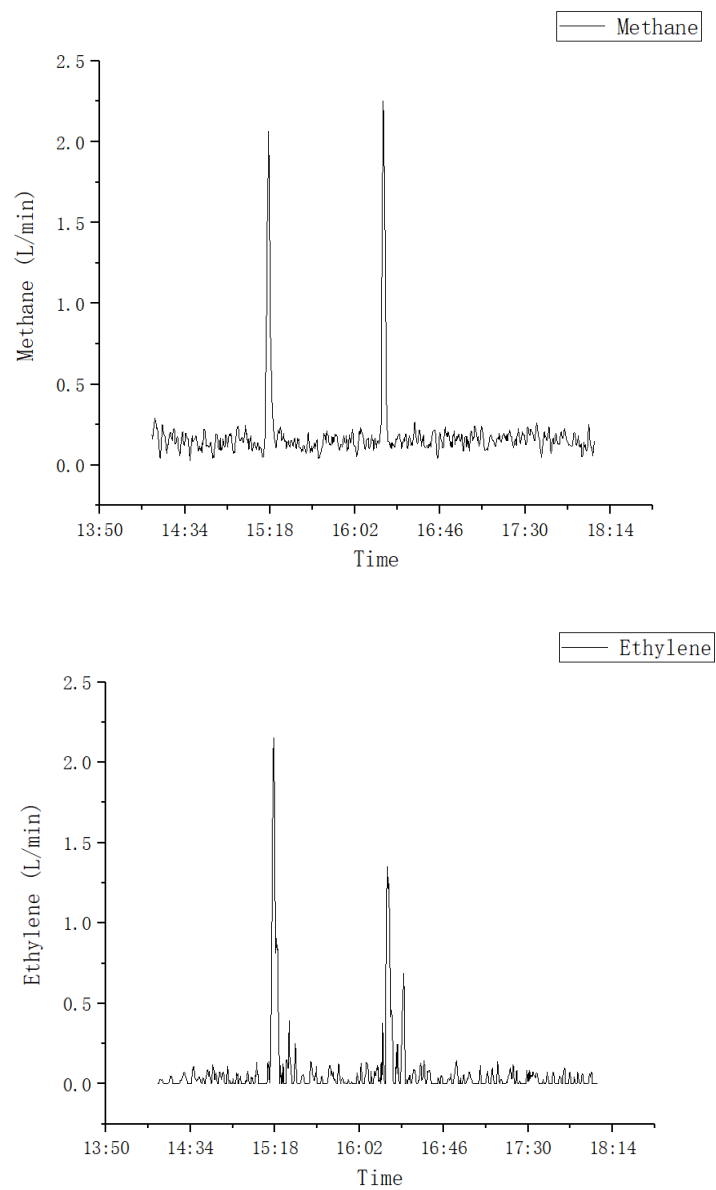


Figure 17. Hydrocarbon species



## Attachment F Sample Photos and Test Photos

Figure 18. Sample before test

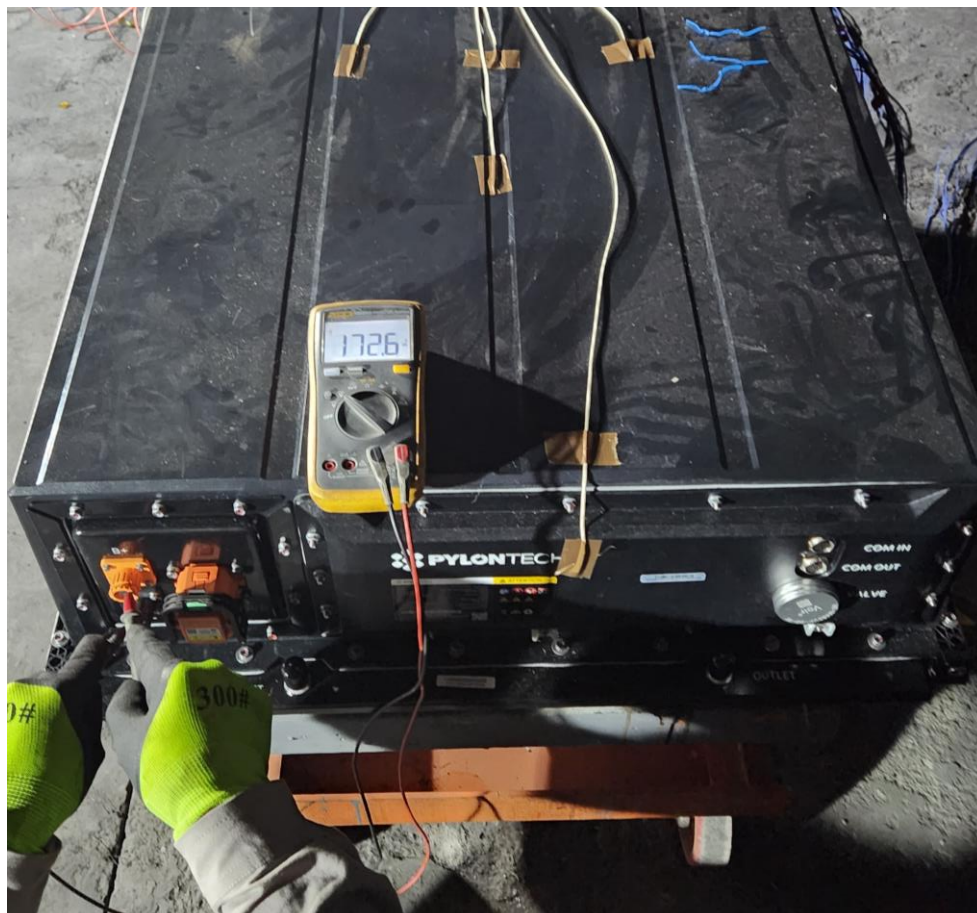




Figure 19. Test setup





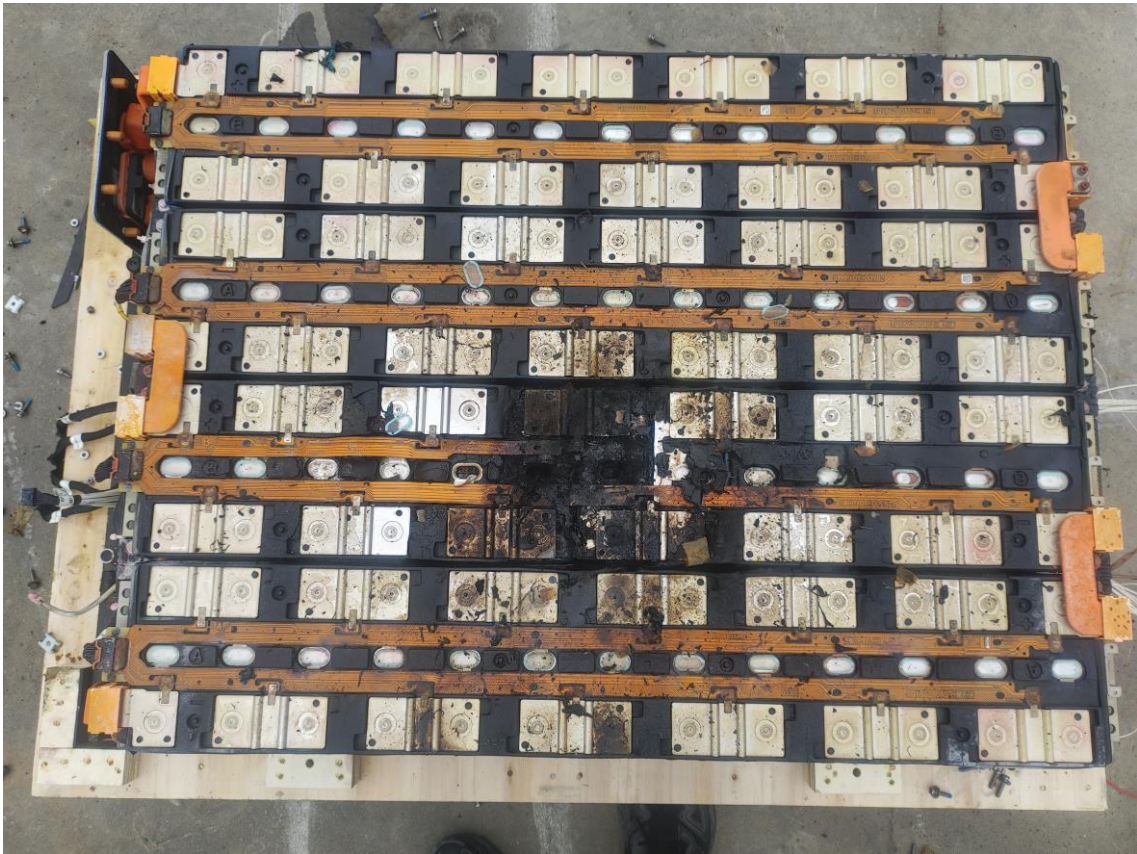
Figure 20. Smoke release during test



Figure 21. Sample after test







## Attachment G List of Test and Measurement Instruments

| No. | Equipment                               | Model                | Rating                                                                                                                  | Inventory no.  | Cal. expire date |
|-----|-----------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------|----------------|------------------|
| 1   | Ambient temperature and humidity        | HWP01-10S            | -30°C~50°C,<br>20%RH~100%RH                                                                                             | 12005577       | 2025.2.2         |
| 2   | Data acquisition equipment              | DAQ970A              | 3-slot cardcage with 6½ digit (22 bit) internal DMM<br>0.004%, accuracy 0.06% Vac                                       | TY2020000138   | 2025.2.2         |
| 3   | Data acquisition equipment              | TP700                | Measuring range-60 °C to 1372 °C<br>Measurement accuracy ±(0.05% rdg.+0.5°C)<br>Display resolution0.01°C                | TY2211000716-2 | 2025.2.2         |
| 4   | Data acquisition equipment              | TP700                | Measuring range-60 °C to 1372 °C<br>Measurement accuracy ±(0.05% rdg.+0.5°C)<br>Display resolution0.01°C                | TY2020000217   | 2025.2.2         |
| 5   | Electronic scale                        | CHAOUC 1             | 0-500KG                                                                                                                 | 65960494169    | 2025.2.2         |
| 6   | Paramagnetic oxygen analyser            | SERVOME X4100        | O2: paramagnetic sensor, range 0-25%, accuracy 0.02%, response time T90 < 7S                                            | ZY2020000018-1 | 2025.2.6         |
| 7   | Velocity probe                          | 2671-25L-D-11-G2-E-N | 4-20mA output, range 0-250pa, accuracy ± 1% F.S                                                                         | ZY2020000018-2 | 2025.2.6         |
| 8   | Photo detector                          | PDA36A2              | Thorlabs optical receiver, wavelength range (350-1000) nm, gain adjustable, voltage output (0-10) V, instability < 0.1% | ZY2020000018-3 | 2025.2.2         |
| 9   | Fourier-Transform Infrared Spectrometer | atmosFIR             | Spectral scanning range: 485 - 7500cm <sup>-1</sup> ; Spectral repeatability: < 0.1cm <sup>-1</sup>                     | ZY2020000018-5 | 2025.3.9         |

|    |                                                                   |               |                                                                                                                                                                                                                 |                |          |
|----|-------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|
| 10 | Non-dispersive infrared carbon dioxide and carbon monoxide sensor | SERVOME X4100 | CO <sub>2</sub> : infrared sensor, measuring range 0-10%, accuracy 1% F.S, response time T <sub>90</sub> < 7S<br>Co: infrared sensor, measuring range 0-1%, accuracy 1% F.S, response time T <sub>90</sub> < 8s | ZY2020000018-4 | 2025.2.6 |
| 11 | Palladium-nickel thin-film solid state sensor                     | MODEL 2000    | Range: 0-2000ppm, temperature less than 100 C, -90~110kPa                                                                                                                                                       | ZY2021000210   | 2025.2.2 |
| 12 | Flame ionization detector                                         | 3010          | Accuracy: 2.0%                                                                                                                                                                                                  | 19937          | 2025.3.9 |
| 13 | Heat flux measurement equipment                                   | MW88-JTC08C   | 0 ~ ± 99999 w / m <sup>2</sup> , - 250 ~ 980 °C, accuracy 5%, response time less than 0.1s,                                                                                                                     | ZY2020000010   | 2025.2.2 |
| 14 | Thermopile                                                        | RS-WD-HW-1    | 0-200 °C, 4-20mA, response speed < 0.15s                                                                                                                                                                        | 28348141942    | 2025.2.2 |