UN Test Report
- ASM P/N SB10H45077 (Nom. 91Wh, 11.4V) -

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2. Test Procedure
3. Test Result
4. Sample Image
Appendix. Drop Test Report

2015. 03. 05
## 1. UN Transportation Regulation Test

<table>
<thead>
<tr>
<th>Test</th>
<th>Condition</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Altitude Simulation</strong></td>
<td>Storing at (low pressure) 11.6kPa for 6hr at 20±5°C</td>
<td>- Measuring mass before/after each test (If M&lt;1g, less than 0.5%, If 1g≤M≤75g, less than 0.2%, If M&gt;75g, less than 0.1%)</td>
</tr>
<tr>
<td><strong>2. Thermal Test</strong></td>
<td>[72±2°C, 6hr ↔ -40±2°C, 6hr, interval max. 30min] x 10cycle (Storing at 20±5°C for 24h)</td>
<td>- Measuring voltage before/after each test (more than 90%) - No leakage, no venting, no disassembly, no rupture, no fire</td>
</tr>
<tr>
<td><strong>3. Vibration</strong></td>
<td>[7Hz↔200Hz↔7Hz, in 15min] x 12 times x 3 direction 1) sinusoidal waveform with a logarithmic sweep 2) 7Hz 18Hz (maintaining 1gn) app. 50Hz (until 8gn) 200Hz (maintaining 8gn), 1.6mm total excursion</td>
<td>- No disassembly, no rupture, no fire within 6 hours after the test - Temp. monitoring (max. 170°C)</td>
</tr>
<tr>
<td><strong>4. Shock</strong></td>
<td>Half sine shock (peak acceleration : 150gn, pulse duration : 6msec) x 6 (±x, y, z), direction x 3 cycle</td>
<td>- No disassembly, no rupture, no fire within 6 hours after the test - Temp. monitoring (max. 170°C)</td>
</tr>
<tr>
<td><strong>5. External Short Circuit</strong></td>
<td>100mΩ ext. short-circuit at 55±2°C 1hr continue after returning at 55±2°C</td>
<td>- No disassembly, no rupture, no fire within 6 hours after the test - Temp. monitoring (max. 170°C)</td>
</tr>
<tr>
<td><strong>6. Impact for cylindrical cells (&gt; 18mm diameter)</strong></td>
<td>Φ=15.8mm bar, 9.1kg mass, 61±2.5cm height</td>
<td>- No disassembly, no fire within 6 hours after the test - Temp. monitoring (max. 170°C)</td>
</tr>
<tr>
<td><strong>7. Crush for cylindrical cells ≤18mm diameter</strong></td>
<td>for prismatic, pouch, coin/button cells Crushing rate: 1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation</td>
<td>- No disassembly, no fire within 6 hours after the test - Temp. monitoring (max. 170°C)</td>
</tr>
<tr>
<td><strong>8. Overcharge</strong></td>
<td>Current = Manufacturer’s recommended max. continuous charge current X 2 Voltage 1. If charge voltage ≤ 18V, V (min.) = 2 x (max. charge voltage) or V (min.) = 22V. 2. If charge voltage &gt; 18V, V (min.) = 1.2 x (max. charge voltage)</td>
<td>- No disassembly, no fire within 7 days after the test</td>
</tr>
</tbody>
</table>
| **9. Forced Discharge** | Discharge at max. discharge current (with 12V DC power supply), Duration time = rated capacity/initial test current | }
2. Test Procedure

Sample Preparation

4 ea 1st cycle Charged Batteries
4 ea 50th cycle Charged Batteries

Test 1
Altitude Simulation

Test 2
Thermal Test

Test 3
Vibration

Test 4
Shock

Test 5
Ext. Short Circuit

5 ea 1st cycle 50% Charged Cells

Test 6
Impact or Crush

Test 7
Overcharge

Test 8
Forced Discharge

10 ea 1st cycle Discharged Cells
10 ea 50th cycle Discharged Cells

Report

LG Chem
### 3-1. T1–T4 Test Result

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>Altitude (T1)</th>
<th>Thermal (T2)</th>
<th>Vibration (T3)</th>
<th>Shock (T4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO.</td>
<td>OCV</td>
<td>Mass</td>
<td>OCV</td>
<td>Mass</td>
</tr>
<tr>
<td>A. 1st cycle fully charged state</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charge</td>
<td>1</td>
<td>12.872</td>
<td>430.81</td>
<td>12.871</td>
<td>430.79</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>12.848</td>
<td>430.96</td>
<td>12.845</td>
<td>430.95</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>12.853</td>
<td>430.73</td>
<td>12.852</td>
<td>430.72</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>12.854</td>
<td>431.00</td>
<td>12.852</td>
<td>430.98</td>
</tr>
<tr>
<td></td>
<td>Ave.</td>
<td>12.857</td>
<td>430.88</td>
<td>12.855</td>
<td>430.86</td>
</tr>
<tr>
<td>B. 50th cycle fully charged state</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charge</td>
<td>5</td>
<td>12.852</td>
<td>430.50</td>
<td>12.851</td>
<td>430.50</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>12.868</td>
<td>430.64</td>
<td>12.865</td>
<td>430.61</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>12.855</td>
<td>430.28</td>
<td>12.851</td>
<td>430.28</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>12.860</td>
<td>430.31</td>
<td>12.859</td>
<td>430.26</td>
</tr>
<tr>
<td></td>
<td>Ave.</td>
<td>12.859</td>
<td>430.43</td>
<td>12.857</td>
<td>430.41</td>
</tr>
</tbody>
</table>

### Requirement
- Measuring mass before/after each test (If M>75g, less than 0.1%, 1g≤M≤75, less than 0.2%, M<1g, less than 0.5%)  
- Measuring voltage before/after each test (more than 90%, only charged samples)  
- No leakage, no venting, no disassembly, no rupture, no fire
# 3-2. T5/T7 Test Result

## EXT. Short Circuit (T5)

<table>
<thead>
<tr>
<th>NO.</th>
<th>Initial OCV (V)</th>
<th>Max. Temp (℃)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 1st cycle fully charged state</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>12.696</td>
<td>56.43</td>
<td>Pass</td>
</tr>
<tr>
<td>2</td>
<td>12.668</td>
<td>55.06</td>
<td>Pass</td>
</tr>
<tr>
<td>3</td>
<td>12.699</td>
<td>56.10</td>
<td>Pass</td>
</tr>
<tr>
<td>4</td>
<td>12.688</td>
<td>56.65</td>
<td>Pass</td>
</tr>
<tr>
<td>MAX.</td>
<td>12.699</td>
<td>56.65</td>
<td>-</td>
</tr>
<tr>
<td>B. 50th cycle fully charged state</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>12.695</td>
<td>56.75</td>
<td>Pass</td>
</tr>
<tr>
<td>6</td>
<td>12.706</td>
<td>54.93</td>
<td>Pass</td>
</tr>
<tr>
<td>7</td>
<td>12.687</td>
<td>56.31</td>
<td>Pass</td>
</tr>
<tr>
<td>8</td>
<td>12.691</td>
<td>55.04</td>
<td>Pass</td>
</tr>
<tr>
<td>MAX.</td>
<td>12.706</td>
<td>56.75</td>
<td>-</td>
</tr>
</tbody>
</table>

### Test Condition

- 100mΩ ext. short-circuit at 55±2℃

### Requirement

- Temperature ≤ 170(℃)
- No disassembly, no rupture, no fire within 6 hours after the test

## EXT. Short Circuit (T7)

<table>
<thead>
<tr>
<th>NO.</th>
<th>Initial OCV (V)</th>
<th>Max. Temp (℃)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 1st cycle fully charged state</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>12.850</td>
<td>23.52</td>
<td>Pass</td>
</tr>
<tr>
<td>10</td>
<td>12.841</td>
<td>23.87</td>
<td>Pass</td>
</tr>
<tr>
<td>11</td>
<td>12.843</td>
<td>24.14</td>
<td>Pass</td>
</tr>
<tr>
<td>12</td>
<td>12.840</td>
<td>23.31</td>
<td>Pass</td>
</tr>
<tr>
<td>MAX.</td>
<td>12.850</td>
<td>24.14</td>
<td>-</td>
</tr>
<tr>
<td>B. 50th cycle fully charged state</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>12.820</td>
<td>24.31</td>
<td>Pass</td>
</tr>
<tr>
<td>14</td>
<td>12.820</td>
<td>23.72</td>
<td>Pass</td>
</tr>
<tr>
<td>15</td>
<td>12.830</td>
<td>23.45</td>
<td>Pass</td>
</tr>
<tr>
<td>16</td>
<td>12.828</td>
<td>23.63</td>
<td>Pass</td>
</tr>
<tr>
<td>MAX.</td>
<td>12.830</td>
<td>24.31</td>
<td>-</td>
</tr>
</tbody>
</table>

### Test Condition

- Max. Charge Current : 5446mA
- CC/CV 2Imax(10892mA) 22V cut-off 24Hr

### Requirement

- No disassembly, no fire within 7 day after the test
# 3-3. T6/T8 Test Result (ICP596766L1)

## Crush (T6)

<table>
<thead>
<tr>
<th>Direction</th>
<th>NO.</th>
<th>Initial OCV(V)</th>
<th>Max. Temp (℃)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat</td>
<td>C-1</td>
<td>3.745</td>
<td>23.22</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>C-2</td>
<td>3.751</td>
<td>22.73</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>C-3</td>
<td>3.749</td>
<td>23.12</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>C-4</td>
<td>3.755</td>
<td>23.40</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>C-5</td>
<td>3.749</td>
<td>23.15</td>
<td>Pass</td>
</tr>
<tr>
<td>MAX.</td>
<td></td>
<td>3.755</td>
<td>23.40</td>
<td></td>
</tr>
</tbody>
</table>

### Test Condition

- Crushing rate :1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation

### Requirement

- Temperature ≤ 170 (℃)
- No disassembly, no fire within 6 hours after the test

## Forced Discharge (T8)

### A. 1st cycle fully discharged state

<table>
<thead>
<tr>
<th>NO.</th>
<th>Initial OCV(V)</th>
<th>Max. Temp (℃)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-6</td>
<td>3.140</td>
<td>47.51</td>
<td>Pass</td>
</tr>
<tr>
<td>C-7</td>
<td>3.145</td>
<td>49.02</td>
<td>Pass</td>
</tr>
<tr>
<td>C-8</td>
<td>3.144</td>
<td>46.92</td>
<td>Pass</td>
</tr>
<tr>
<td>C-9</td>
<td>3.143</td>
<td>49.16</td>
<td>Pass</td>
</tr>
<tr>
<td>C-10</td>
<td>3.138</td>
<td>47.30</td>
<td>Pass</td>
</tr>
<tr>
<td>C-11</td>
<td>3.139</td>
<td>49.39</td>
<td>Pass</td>
</tr>
<tr>
<td>C-12</td>
<td>3.138</td>
<td>48.23</td>
<td>Pass</td>
</tr>
<tr>
<td>C-13</td>
<td>3.137</td>
<td>48.42</td>
<td>Pass</td>
</tr>
<tr>
<td>C-14</td>
<td>3.136</td>
<td>46.95</td>
<td>Pass</td>
</tr>
<tr>
<td>C-15</td>
<td>3.142</td>
<td>47.76</td>
<td>Pass</td>
</tr>
<tr>
<td>MAX.</td>
<td>3.145</td>
<td>49.39</td>
<td></td>
</tr>
</tbody>
</table>

### Test Condition

- Discharge at max. discharge current (with 12V DC power supply) : 3890mA
  - Duration time: rated capacity (60min)

### Requirement

- No disassembly, no fire within 7 days after the test
4. Sample Image
Declaration

We, LG Chem, Ltd. hereby declares, that the product

Product Name: Rechargeable Li-ion Battery Pack
Regulatory Model Number: SB10H45077

Based on the request of SRICI, LG Chem, Ltd. submits a letter of authorization regarding below changes have no impact on UN38.3 test report. LG Chem, Ltd. confirms all specifications are identical except for below changes.

<table>
<thead>
<tr>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Change the capacity value to 90Wh from 91Wh on the label.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Before image" /></td>
<td><img src="image2.jpg" alt="After image" /></td>
</tr>
</tbody>
</table>

Date: July 14th, 2016

Name / Title: Dae Ho Nam / Senior Manager