# MATERIAL SAFETY DATA SHEET

## SECTION 1 PRODUCT IDENTIFICATION

**Product Identification**
- Polymer Lithium-Ion Rechargeable Battery
- Nominal Voltage: 3.7V
- Nominal PACK Capacity: 2200mAh
- PACK P/N: DAP574868PA
- Customer P/N-1:
- Cell P/N: PP574868AB
- Nominal Cell Capacity: 2200mAh
- Cell UL NO:
- PACK UL NO:
- Nominal PACK Capacity: 2200mAh
- Customer Model Name:

**Manufacture Identification**
- Tianjin Lishen Battery Joint-Stock CO. LTD.
- 6 Lanyuan Road, Huayuan Hi-Tech Industry Park, Tianjin 300384, China
- Phone Number (For Information): 86 - 22 - 83710366
- Emergency Phone Number: 86 - 22 - 83710366
- Telex: 86 - 22 - 83710366

## SECTION 2 COMPOSITION & INFORMATION ON INGREDIENTS

### Chemical Names and Common Names

<table>
<thead>
<tr>
<th>Component</th>
<th>Chemical Name</th>
<th>Common Name</th>
<th>Hazardous Components</th>
<th>Carcinogens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium Cobalt</td>
<td>Lithium Cobalt</td>
<td>Cobaltite</td>
<td>Yes (Hazardous)</td>
<td>No (Carcinogen)</td>
</tr>
<tr>
<td>Graphite Carbon</td>
<td>Graphite Carbon</td>
<td>Graphite</td>
<td>Yes (Hazardous)</td>
<td>No (Carcinogen)</td>
</tr>
<tr>
<td>Lithium Hexafluorophosphate</td>
<td>Lithium Hexafluorophosphate</td>
<td>Lithium Hexafluorophosphate</td>
<td>Yes (Hazardous)</td>
<td>No (Carcinogen)</td>
</tr>
<tr>
<td>Organic solvent</td>
<td>Organic solvent</td>
<td>Organic solvent</td>
<td>Yes (Hazardous)</td>
<td>No (Carcinogen)</td>
</tr>
</tbody>
</table>

### Equivalent lithium content per cell:
- 0.66g

### CAS Numbers:
- Lithium: 7440-44-7
- Cobaltite: 12204-79-3
- Lithium Hexafluorophosphate: 21324-40-3
- Graphite: 1314-12-7
- Organic solvent: 20381-17-8

### Non-Hazardous Ingredients:
- tabs, pouch, separator, etc.

## SECTION 3 HAZARDS IDENTIFICATION

### Primary Routes of Entry

<table>
<thead>
<tr>
<th>Route</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Skin Contact</td>
<td>Skin contact</td>
</tr>
<tr>
<td>Ingestion</td>
<td>Ingestion</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Inhalation</td>
</tr>
</tbody>
</table>

### Health Hazards

- All chemicals are contained in a sealed can. Risk of exposure occurs only, if the battery is mechanically or electrically abused (mechanical, thermal, electrical), which leads to the rupture of the battery container. Electrolyte leakage, electrode materials reaction with moisture/water or battery vent/fire may follow, depending upon the circumstances.

### Medical Conditions Generally Aggravated by Exposure

- An acute exposure will not generally aggravate any medical condition.

### Symptoms of Exposure

- Skin contact: no effect under routine handling and use.
- Inhalation: no effect under routine handling and use.
- Ingestion: no effect under routine handling and use.
- Inhalation: no effect under routine handling and use.
- Ingestion: no effect under routine handling and use.

### Health Conditions Generally Aggravated by Exposure

- Not applicable

## SECTION 4 FIRST-AID MEASURES

### If exposure to internal materials in cell due to damaged outer casing, the following actions are recommended.

- **Inhalation**
  - In case of light inhalation, move to an area with fresh air immediately, if irritation persists, get medical help.
- **Ingestion**
  - In case of ingestion, drink milk/water to induce vomiting and wash out, get medical help.

### For special fire-fighting procedures:

**Extinguisher Media:**
- CO₂ or dry chemical power

**Special Fire-fighting Procedures:**
- In case of fire in cell original containers, use CO₂ or dry chemical extinguisher; For fire in an adjacent area, water can be used.

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### On Land:

- Place material into suitable containers, if the skin has come into contact with the electrolyte, it should be washed thoroughly with water, sand or earth should be used to absorb any exuded material. Seal leaking battery and contaminated absorbent material should be treated by local regulation, and call local fire/police department for help.

### In Water:

- If possible, remove from water far from body in special fixture, and call local fire/police department for help.

Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.
SECTION 7 HANDLING AND STORAGE

Handling:
- Take all precautions mentioned in this document and operate the battery within the temperature range of -20°C and 45°C.
- No special protective clothing required for handling individual cells in corrective operational method.
- Improper handling of lithium ion battery may result in injury or damage from electrolyte leakage, heating, ignition or explosion. So do not crush, pierce, short cell/battery terminals with conductive
- Storage:
  - Store the battery in a cool, drying plane, without chemical vapor or excessive humidity.

SECTION 8 EXPOSURE CONTROLS & PERSONAL PROTECTION

Engineering Controls:
- keep away from heat and open flame, prevent hard & sharp thing penetration, store in a cool & dry place.

Personal Protection:
- Respiratory Protection: Not necessary under normal operation condition. SCBA required in the event of a fire.
- Eye/Face Protection: Not necessary under normal operation condition.
- Glove Protection: Not necessary under normal operation condition.
- Foot Protection: Steel toed shoes recommended for large container handling.

VENTILATION TO BE USED

- Local Exhaust: Not necessary under conditions of Normal use.
- Mechanical (General): Not necessary under conditions of Normal use.
- Other (Specify): Not necessary under normal operation conditions.

SECTION 9 PHYSICAL /CHEMICAL PROPERTIES

Specific Gravity [H2O=1]: LiCoO2:3.80
- Graphite:2.0~2.2
- Melting Point:
  - LiCoO2:1130°C
  - Graphite:3500~3900°C
- Appearance and Odor:
  - LiCoO2 is a gray odorless power; Graphite is a black or odorless power.
  - Organic solvent is a colorless liquid; Lithium salt is a white, crystalline and odorless power.

SECTION 10 STABILITY & REACTIVITY DATA

- Stability
  - Stable
    - Do not heat or incinerate the battery. Never impact, pierce or crush the battery.
  - Unstable
    - Do not charge the battery under high temperature conditions such as near a fire or in the direct sunlight.
    - Do not short-circuit the battery by connect the positive and negative terminals with a metal material.
    - Do not allow the battery to get wet or be immersed in water.

- Incompatibility (Materials to Avoid)
  - Water, salted water, other solvent with water

- Hazardous Decomposition Products
  - N/A

- Hazardous Polymerization
  - May Occur
  - Will Not Occur

SECTION 11 TOXICOLOGICAL INFORMATION

This product does not elicit toxicological properties during routine handling and use.

SECTION 12 ECOLOGICAL INFORMATION

Cobalt and its compounds can pose a threat if released to environment. The detail information are showed in waste disposal method in Section 13 "Disposal Consideration".
SECTION 13 DISPOSAL CONSIDERATIONS

There is no contamination during normal operation and use. Lithium batteries should have their terminals insulated prior to disposal, do not throw away a used battery and provide them for recycling company.

Open cells should be treated as hazardous waste. If the leakage or other material is Released, we should take actions as follows:

- Leave the area, allow the batteries to cool down, let the vapors to dissipate.
- Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate after.

Waste Disposal method: Opened cells should be treated as hazardous waste.

Incitement should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment.

Landfilling: According to the proper laws and regulations in different countries or areas, the battery should be buried deeply in the specified place;

Recycling: Send to authorized recycling facilities to get Co, Cu and Al, eventually through licensed waste carrier;

SECTION 14 Transportation

Lishen’s DAP574868PA Lithium-Ion Polymer batteries are considered to be “Rechargeable Lithium Ion Polymer Batteries” and meet the requirements of transportation by the United States Department of Transportation (DOT), International Civil Aviation Administration (ICAO), International Air Transportation Association (IATA) special provision UN3480 as “non-dangerous goods” or “non-hazardous materials”. These lithium batteries can be transported in nonrestrictive material and as Non-Dangerous Goods as they meet all the requirements in below:

- Lithium content requirement
  - For the bar cells, the lithium content can not overpass 20Wt/h;
  - For the batteries, the lithium content can not overpass 100Wt/h;

- 15. Transport information:
  - Avoid transportation which may cause damage of package.
  - For Lithium ion batteries, the Web-base rating is no more than 300Wh or 100W/kg.
  - Battery pack can be treated as “non-dangerous goods” by the United Nations Recommendations in the Transport of Dangerous Goods Special Provisions 18, provided that the product is transported under outlined risk and are packaged in accordance with authorized testing group 3 performance level.
  - The equipment complies with the Packing Instruction 965 under IATA and so the cargo can be exported from Dangerous Goods regulation.

SECTION 15 REGULATORY INFORMATION


SECTION 16 OTHER INFORMATION

There is no hazards in accordance with the UN recommendations test (UN manual of tested and criteria 38.3):

<table>
<thead>
<tr>
<th>Test NO</th>
<th>Test Item</th>
<th>Criteria</th>
<th>Result</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.3.4.1</td>
<td>Altitude Test</td>
<td>No mass loss, leakage, disassembly, rupture and fire; OCV should not be less than 90% before testing.</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>38.3.4.2</td>
<td>Thermal Test</td>
<td>No mass loss, leakage, disassembly, rupture and fire; OCV should not be less than 90% before testing.</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>38.3.4.3</td>
<td>Vibration</td>
<td>No mass loss, leakage, disassembly, rupture and fire; OCV should not be less than 90% before testing.</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>38.3.4.4</td>
<td>Shock</td>
<td>No mass loss, leakage, disassembly, rupture and fire; OCV should not be less than 90% before testing.</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>38.3.4.5</td>
<td>External Short Circuit</td>
<td>External temperature should not exceed 170degC. No disassembly, and fire within six hours of this text.</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>38.3.4.6</td>
<td>Impact</td>
<td>External temperature should not exceed 170degC. No disassembly, and fire within six hours of this text.</td>
<td>Passed</td>
<td>Only for cell</td>
</tr>
<tr>
<td>38.3.4.7</td>
<td>Overcharge</td>
<td>No disassembly, and fire within seven days of this text.</td>
<td>Passed</td>
<td>Only for battery</td>
</tr>
<tr>
<td>38.3.4.8</td>
<td>Forced Discharge</td>
<td>No disassembly, and fire within seven days of this text.</td>
<td>Passed</td>
<td>Only for cell</td>
</tr>
</tbody>
</table>