Lithium Ion Polymer
Battery Handling Guidelines
1. **Scope**

This application specification shall be applied to Lithium ion polymer batteries manufactured by HDP.

2. **General Handling and Precautions**

2.1 In case of contacting the materials from a damaged or ruptured cell or battery:
- **Eye contact:** Washing immediately with plenty of water and soap or for at least 15 minutes.
- **Skin contact:** Washing immediately with water and soap.
- **Inhalation of Vented Gas:** Remove to fresh air. Get medical attention.
- **Ingestion:** Get medical attention immediately.

2.2 Keep away batteries from children.

2.3 The cells/batteries are requested to be stored within a proper temperature range specified in the respective specifications.

2.4 Do not store batteries in a manner that allows terminals to short circuits.

2.5 Do not place batteries near heating sources, nor exposed to direct sunlight for long periods. Elevated temperature can result in reduced battery service life.

2.6 Charging the battery

Use only approved chargers and procedures. Improperly charging a cell or battery may cause the cell or battery to flame or damage.

Charge the battery using the “CCCV” or constant current/constant voltage method.

Do not charge the battery with current or voltage higher than the specified maximum value in the respective specifications. The absolute maximum charging voltage is 4.25V per cell.

Prohibit reverse charging of battery. The battery must be connected correctly.

2.7 Discharging Battery

Discharge battery at the max current specified in the respective specification. If you plan to discharge the battery at higher current than max current, please consult HDP.

Avoid discharge the battery below 2.75V for each cell.

Do not over-discharge the battery. Over-discharging can damage the performance of the battery. It should be noted that the cell/battery would be at an over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell/battery shall be charged periodically to maintain between 3.7V and 4.1V.

2.8 Operation Temperature

The battery shall be operated (stored, charged and discharged) in the temperature specified in respective specifications.

2.9 Storage requirement

2.9.1 Storage time VS storage and ambient temperature

- One month: -20°C ~ 60°C
- Three month: -20°C ~ 45°C
- Twelve month: -20°C ~ 25°C
2.9.2 Relative humidity ≤ 75%, Clean, dry and ventilated indoor environment.

2.9.3 Warning in storage
1. Avoid short circuit when storage
2. Do not lay the battery close to the heat source or expose in the sunshine for long time. High temperature will shorten its working life.
3. If the battery does not work for long time, its over discharge phenomena will be showed via its self discharge characteristic. In order to prevent over discharging in storage, the battery will be charged periodically and make its voltage keep 3.7 ~ 4.0V. Periodically maintaining batteries during the term of storage is necessary, recommended every 3 months after the receipt of the battery and charge the battery up to 50% of the total capacity.

2.10 Cell/Battery Protection Circuits Module (PCM)
The cell/battery must be equipped with a PCM that protects the cell/battery from overcharging, over-discharging and over-current.

2.11 Battery Short Circuit
Do not short-circuit a battery. A short circuit can result in over-heating of terminals and provide in ignition source.
More than a momentary short circuit will generally reduce the cell or battery service life and can lead to ignition of surrounding materials within the cell or battery if the seal integrity is damaged.
Extended short-circuiting creates high temperature in the cell and at the terminals. Physical contact to high temperatures can cause skin burns. In addition, extended short-circuit may cause the cell or battery to flame.
Prohibit reversing cell polarity within a battery assembly.

2.12 The cell edge of the heat seal zone is electronically conductive. Avoid the edge cross battery terminals, PCB, or conductive surfaces.

2.13 Do not bend or fold or fall the battery or part of the battery. It may cause the battery be damaged and result in the battery swelling, leaking, explosive or ignition.

2.14 Do not open or manipulate the folded cell edge.

2.15 Do not bend or fold the sealing edge. And do not tear off the sealing film.

2.16 Battery Pack Design
The battery housing should have sufficient mechanical strength.
No sharp edge components shall be inside the battery housing. The sharp edge may destroy the cell packaging.
No cell movement is allowed in the battery housing.
The ultrasonic head shall not directly/ or indirectly pressed the cell if you need to enclose the battery housing by ultrasonic method. Please consult HDP for designing the ultrasonic head.
Avoid designing airtight battery housing.
2.17 Battery Assembly

We recommend ultrasonic welding or spot welding to connect battery with PCM or other parts.

If you employ manual solder method to connect tab with PCM, please pay attention to the followings:

- Use a solder with temperature controlled and ESD
- Soldering temperature should not exceed 350°C
- Soldering times should not be longer than 3s
- Soldering times should not exceed 5 times
- Keep battery tab cold down before next time soldering
- Do not directly heat cell body. It may cause the battery be damaged by heat above 90°C

2.18 Battery Disassembly

Never disassemble a battery

If a battery is unintentionally be crushed, thus releasing its contents, rubber gloves must be used to handle components. Avoid inhalation of any vapors that may be emitted.

2.19 Do not mixed Batteries and Types. Avoid using old and new cells of different sizes, different chemistry or types in the same battery assembly.

2.20 Other warnings

- Do not heat or dispose the battery into fire, water or other liquids.
- Do not put the battery into microwave, washing machine or drying machine.
- Do not put the battery onto oven.
- Do not use a damaged battery.
- Do not pierce battery/cell with nail or sharp material.
- Do not cut battery/cell with knife.
- Do not tear off the sealing film of the battery/cell.
- When assembly, application, operation of the battery/cell, do not extruding, impacting and puncturing battery/cell by keen-edged materials or sharp pointed material.
3 Lithium Polymer battery generally adopts aluminum film package, which is very thin and flexible and can easily be damaged. Please find the explanation pictures and solution as below.
Possible causes that may damage aluminum film

**Operator**
- Ring
- Metal part in the watch

Suggest the operators not wear any metal decoration.

**Operating process**
- Puncture it with bamboo pro
- Puncture it with forceps
- Contacts between the cells
- Contacts of the horn of the electrode pin
- When assembling, contacts with table
- Others

**Operation tool**
- Head of bolt
- Horn of tool

**Equipment**
- Metal frame of the operation table
- Front part of contact wire
- The horn of table

**Scraps of Tin welding**
- Power of metal
4 Others
All the specifications are subjected to change without prior notice.
HDP shall make no liability for problems that occur when the above specifications are not followed.