



***Intec Industries Co., Ltd.***

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# SPECIFICATION

<b>Type:</b>	Lithium Ion Rechargeable Battery
<b>Model No.:</b>	ILI-103450U1
<b>Prepared:</b>	HML
<b>Approved:</b>	LFX
<b>Date:</b>	Nov 20, 2008



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## 1 PREFACE

This specification applies to the Intec lithium ion prismatic rechargeable batteries or battery packs. Intec reserves the right to alter the product design or amend this specification without prior notice.

## 2 SCOPE

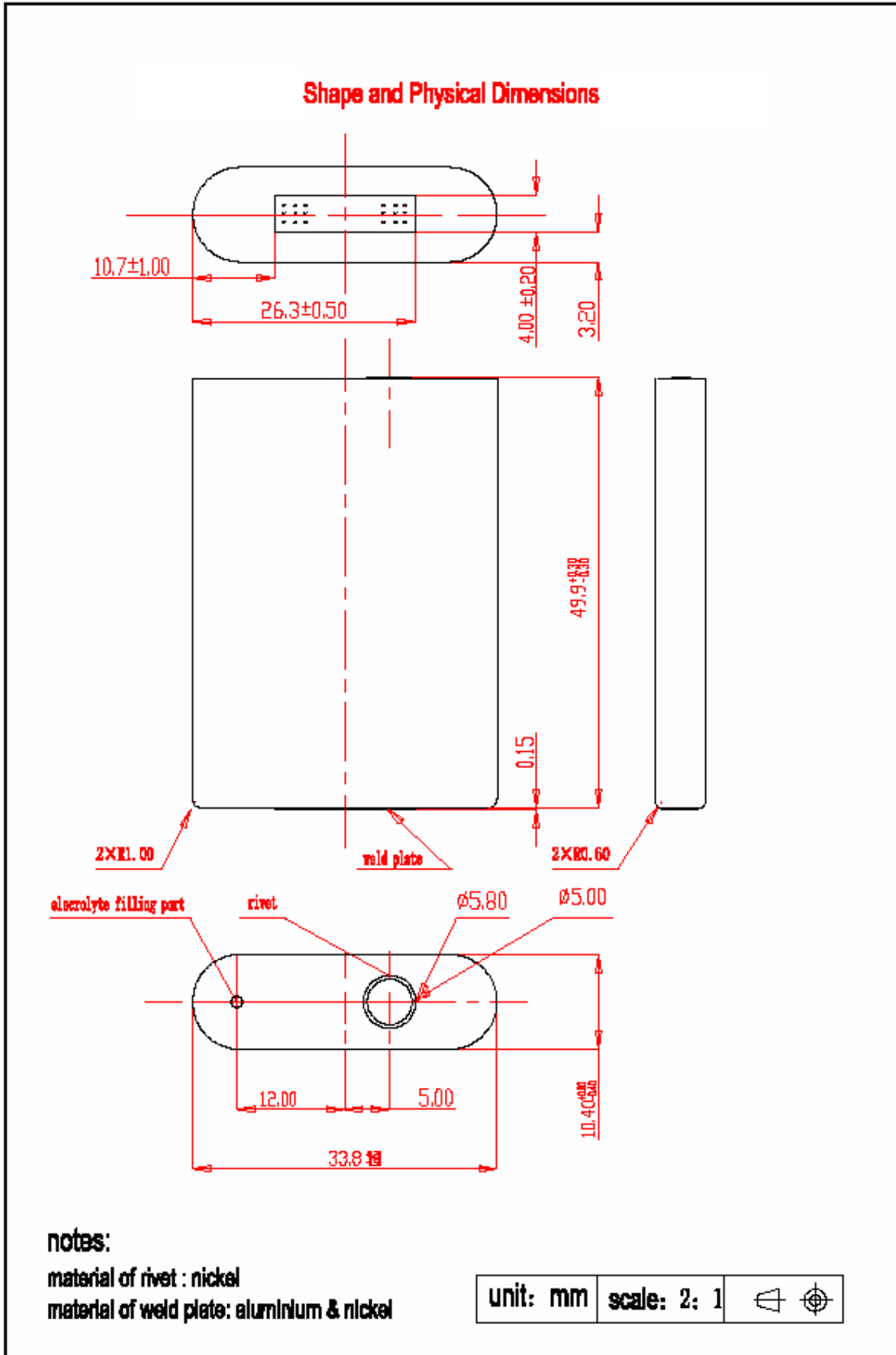
This specification applies to ILI-103450U1 Li-Ion prismatic rechargeable battery. It provides technical data, characteristics, safety data and precautions for this battery type.

## 3 CELL CHARACTERISTICS

3.1	Battery Type	ILI-103450U1
3.2	Material of Case	Aluminium
3.3	Nominal Voltage	3.7 V
3.4	Rated Capacity	1800 mAh @ 0.2C discharge, 3.0V cut-off
3.5	Impedance	$\leq 65 \text{ m}\Omega$
3.6	Discharge Cut-off Voltage	3.0V
3.7	Standard Charge Current	360mA (0.2C)
3.8	Max Charge Current	1260mA (0.7C)
3.9	Max Discharge Current	3600mA (2C)
3.10	Max Charge Voltage	4.2V
3.11	Charge method	CC/CV (constant current/constant voltage)
3.12	Dimension	Thickness: $10.40^{+0.00}_{-0.40} \text{ mm}$ Width: $33.80^{+0.20}_{-0.50} \text{ mm}$ Height: $49.70^{+0.30}_{-0.30} \text{ mm}$
3.13	Weight	Approx. 36.5g
3.14	Operating Temperature:	Charging Temperature: $0\sim+40^{\circ}\text{C}$ Discharging Temperature: $-20\sim+45^{\circ}\text{C}$
3.15	Storage Temperature	1 month $-10\sim+40^{\circ}\text{C}$ 3 month $-5\sim+20^{\circ}\text{C}$ (low humidity)
3.16	Visual Requirements	Defects, such as scratches, flaws, dirty spots, rust, deformation, discoloration and leakage are not acceptable.



**4 GENERAL MECHANICAL SPECIFICATION**





## 5. PERFORMANCE AND SAFETY TESTS

Testing Conditions (unless otherwise specified)

Temperature:  $20 \pm 5^{\circ}\text{C}$

Relative Humidity:  $65 \pm 20\%$

Charging Procedure for Test Purpose

Prior to charging, the cell shall be discharged at a constant current of  $0.2C_5A$  down to a specified end-of-discharge voltage.

Unless otherwise stated in the standard, cells shall be charged at a constant current of  $1C_5A$  until the voltage is  $4.2V$ , and then charged at a constant voltage of  $4.2V$  until its current is  $0.02C_5A$ .

Characteristics and Requirements

### Electrical Characteristics

NO	Test Item	Test Method	Criteria
1	Capacity at $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ (rated capacity)	The cell shall be charged in accordance with 5.2, and stored in an ambient temperature of $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for not less than 1h and not more than 4h, then discharged at a constant current of $0.2C_5A$ until its voltage is $3.0V$ . Above steps may be repeated up to four additional times as necessary to comply with this requirement.	$\geq 100\%C_5Ah$
2	Capacity at $-20^{\circ}\text{C} \pm 2^{\circ}\text{C}$	The cell shall be charged in accordance with 5.2, and stored in an ambient temperature of $-20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for not less than 16h and not more than 24h, then discharged at a constant current of $0.2C_5A$ until its voltage is $3.0V$ .	$\geq 25\%C_5Ah$
3	High Rate Discharge Capacity at $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$	The cell shall be charged in accordance with 5.2, and stored in an ambient temperature of $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for not less than 1h and not more than 4h, then discharged at a constant current of $1C_5A$ until its voltage is $3.0V$	$\geq 85\%C_5Ah$



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NO	Test Item	Test Method	Criteria
4	Charge (Capacity) Retention and Recovery	The cell shall be charged in accordance with 5.2, and stored in an ambient temperature of $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 28days, then discharged at a constant current of $1\text{C}_5\text{A}$ until its voltage is 3.0V. The 28days retained capacity delivered shall meet the criteria. After that, the cell shall be stored in an ambient temperature of $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for not less than 1h and not more than 4h, then discharged at a constant current of $0.2\text{C}_5\text{A}$ until its voltage is 3.0V, the recovery capacity shall meet the criteria.	Retention: $\geq 80\%C_5\text{Ah}$ Recovery: $\geq 85\%C_5\text{Ah}$
5	Endurance in Cycles	The cell shall be charged in accordance with 5.2, and discharged at a constant current of $1\text{C}_5\text{A}$ until its voltage is 3.0V, then continuously charged and discharged as above steps until its delivered capacity is less than 60% of the initial capacity. The number of charge-and-discharge cycle times should be not less than that specified for this characteristic.	400cycles

Environment Characteristics

6	Heating Test	The cell is to be heated in a gravity convection or circulating air oven with an initial temperature of $20 \pm 5^{\circ}\text{C}$ . The temperature of the oven is to be raised at a rate of $5 \pm 2^{\circ}\text{C}$ ( $9 \pm 3.6^{\circ}\text{F}$ ) per minute to a temperature of $130 \pm 2^{\circ}\text{C}$ ( $302 \pm 3.6^{\circ}\text{F}$ ) and remain for 30 minutes. The sample shall return to room temperature ( $20 \pm 5^{\circ}\text{C}$ ) and then be examined.	The samples shall not explode or catch fire
7	Low Pressure (Altitude Simulation) Test	Sample cells are to be stored for 6 hours at an absolute pressure of 11.6 kPa (1.68 psi) and a temperature of $20 \pm 3^{\circ}\text{C}$ ( $68 \pm 5^{\circ}\text{F}$ ).	The samples shall not explode or catch fire as a result of the Altitude Simulation Test.



NO	Test Item	Test Method	Criteria
8	Temperature Cycling Test	<p>The cells are to be placed in a test chamber and subjected to the following cycles:</p> <p>a) Raising the chamber-temperature to <math>70\pm 3^{\circ}\text{C}</math> (<math>158\pm 5^{\circ}\text{F}</math>) within 30 minutes and maintaining this temperature for 4 hours.</p> <p>b) Reducing the chamber temperature to <math>20\pm 3^{\circ}\text{C}</math> (<math>68\pm 5^{\circ}\text{F}</math>) within 30 minutes and maintaining this temperature for 2 hours.</p> <p>c) Reducing the chamber temperature to minus <math>20\pm 3^{\circ}\text{C}</math> (minus <math>40\pm 5^{\circ}\text{F}</math>) within 30 minutes and maintaining this temperature for 4 hours.</p> <p>d) Raising the chamber temperature to <math>20\pm 3^{\circ}\text{C}</math> (<math>68\pm 5^{\circ}\text{F}</math>) within 30 minutes.</p> <p>e) Repeating the sequence for a further 9 cycles.</p> <p>f) After the 10<sup>th</sup> cycle, storing the cells for a minimum of 24 hours, at a temperature of <math>20\pm 5^{\circ}\text{C}</math> (<math>68\pm 9^{\circ}\text{F}</math>) prior to examination.</p>	The samples shall not explode or catch fire.

Safety Test

9	Short-Circuit Test	<p>Each test sample cell, in turn, is to be short-circuited by connecting the positive and negative terminals of the cell with a circuit load having a maximum resistance load of 0.1 ohm. The cell is to discharge until it has reached a completely discharged state of less than 0.1 volts and the cell case temperature has returned to <math>\pm 10^{\circ}\text{C}</math> (<math>\pm 18^{\circ}\text{F}</math>) of ambient temperature. Tests are to be conducted at <math>20\pm 5^{\circ}\text{C}</math> (<math>68\pm 9^{\circ}\text{F}</math>). The cells are to reach equilibrium at <math>20\pm 5^{\circ}\text{C}</math>, as applicable, before the terminals are connected.</p>	<p>The samples shall not explode or catch fire.</p> <p>The temperature of the exterior cell or cell casing shall not exceed <math>150^{\circ}\text{C}</math> (<math>302^{\circ}\text{F}</math>).</p>
10	Abnormal Charging Test	<p>Cells discharged to the rated capacity are to be used for this test. The cells are to be tested in an ambient temperature of <math>20\pm 5^{\circ}\text{C}</math> (<math>68\pm 9^{\circ}\text{F}</math>). Each test sample cell is to be discharged at a constant current of 0.2C / 1 hour to 3.0V. The cell is then to be charged with a constant voltage of 4.6V and a current limit of 3C<sub>5</sub>A. Charging duration is to be 7 hours.</p>	The samples shall not explode or catch fire.



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NO	Test Item	Test Method	Criteria
11	Impact Test	<p>The cell is to be placed on a flat surface. A 5/8 inch (15.8 mm) diameter bar is to be placed across the center of the sample. A 20 pound (9.1 kg) weight is to be dropped from a height of 24±1 inch (610 ±25 mm) onto the sample. The cell is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 5/8 inch (15.8 mm) diameter curved surface lying across the center of the test sample. It is also to be rotated 90 degrees around its longitudinal axis so that both the wide and narrow sides are subjected to the impact. Each sample cell is to be subjected to only a single impact. Separate samples are to be used for each test.</p>	<p>The samples shall not explode or catch fire.</p>
12	Shock Test	<p>The cell is to be secured to the testing machine by means of a rigid mount which supports all mounting surfaces of the cell. Each cell shall be subjected to a total of three shocks of equal magnitude. The shocks are to be applied in each of three mutually perpendicular directions. Each shock is to be applied in a direction normal to the face of the cell. For each shock the cell is to be accelerated in such a manner that during the initial 3 milliseconds the minimum average acceleration is 75g (where g is the local acceleration due to gravity). The peak acceleration shall be between 125 and 175g. Cells shall be tested at a temperature of 20±5°C (68±9 °F).</p>	<p>The samples shall not explode or catch fire.</p>
13	Vibration Test	<p>The cell is to be subjected to simple harmonic motion with amplitude of 0.03 inch (0.8 mm) [0.06 inch (1.6 mm) total maximum excursion. The frequency is to be varied at the rate of 1 hertz per minute between 10 and 55 hertz, and return in not less than 90 nor more than 100 minutes. The cell is to be tested in three mutually perpendicular directions.</p>	<p>The samples shall not explode or catch fire.</p>



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## **6. WARNINGS AND CAUTIONS**

### **WARNINGS:**

1. Do not immerse the battery in water or seawater, and keep the battery in a cool dry surrounding if it stands by.
2. Do not expose the cell to extreme heat or flame.
3. When recharging, use the battery charger specifically for that purpose.
4. Do not reverse the position (+) and negative (-) terminals for any reason.
5. Do not connect the battery to an electrical outlet.
6. Do not short-circuit, over-charge or over-discharge the cell.
7. Do not subject the cell to strong mechanical shocks.
8. Do not directly solder the battery and pierce the battery with a nail or other sharp object.
9. Do not disassemble or modify the cell.
10. Do not handle or store with metallic like necklaces, coins or hairpins, etc.
11. Do not touch a leaked cell directly.
12. Keep cell away from children.

### **PRECAUTIONS:**

1. Do not use or leave the battery at very high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). Otherwise, it can overheat or fire or its performance will be affected and its service life will be decreased.
2. Do not use it in a location where static electricity is high, otherwise, the safety devices may be damaged, causing hidden trouble of safety.
3. If the battery leaks, and the electrolyte get into the eyes. Do not rub eyes, instead, rinse the eyes with clean running water, and immediately seek medical attention. Otherwise, it may injure eyes or cause a loss of sight.
4. If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charger and stop using it.
5. In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.
6. Be aware discarded batteries may cause fire, tape the battery terminals to insulate them.