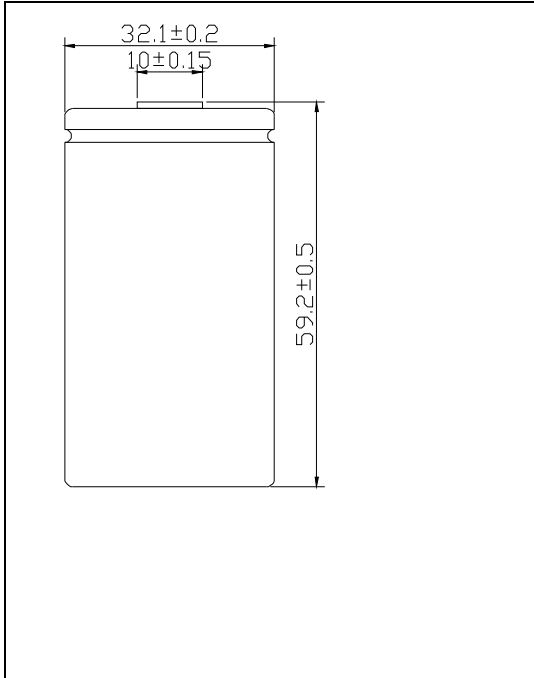


# 力能达/LND Battery Co., LTD.

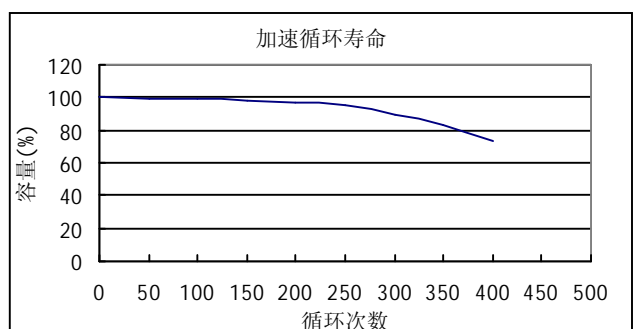
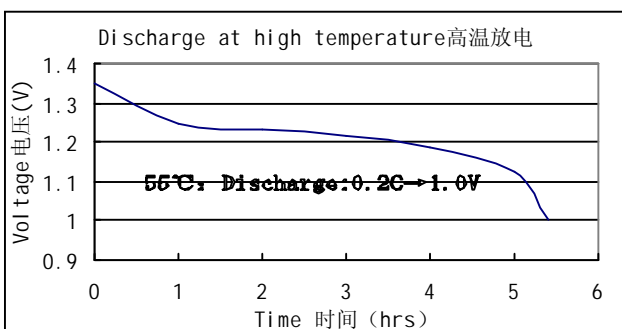
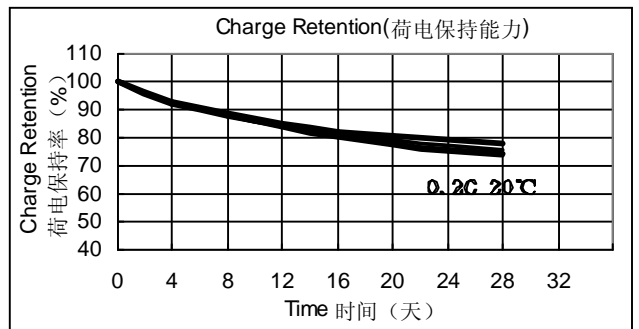
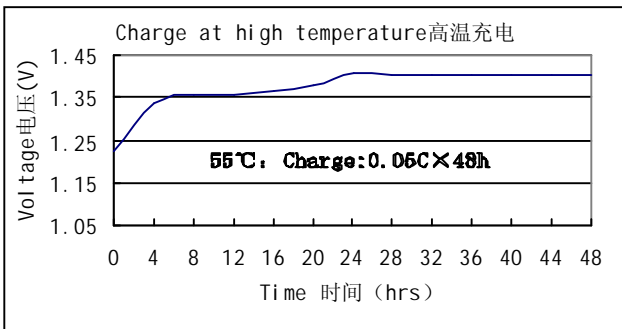
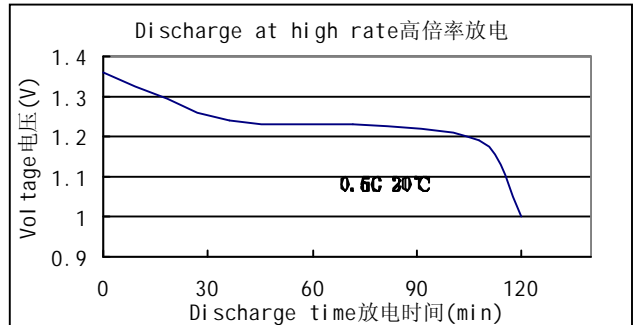
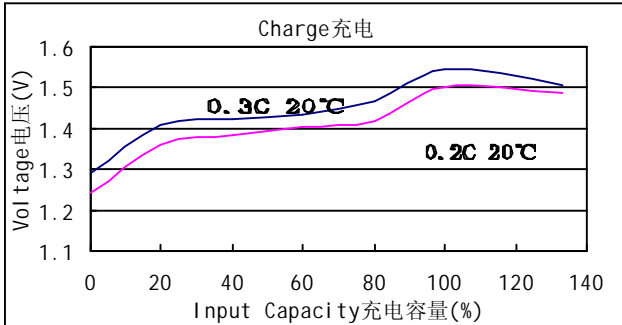
MODEL No: 4000D-HT

Description: 4000mAh HIGH TEMPERATURE D SIZE NI-CD



## Specification

Nominal Capacity		4000mAh	
Nominal Voltage		1.2 V	
Charge current	Standard	400mA	
	Quick	800 mA	
	Fast	1200 mA	
Charge time	Standard	14~16Hrs	
	Quick	6Hrs	
	Fast	4Hrs	
Ambient Temperature	charge	Standard	0~55°C
		Quick	10~55°C
		Fast	10~55°C
	Discharge		-20~55°C
	Storage		-20~55°C
Internal Impedance(mΩ) (Upon fully charge)		15mΩ	
weight		115g	



# LND

Document Title: Product Specification of High Temperature Ni-Cd 4000D-HT Cell and Stack up Batteries

## 1、SCOPE

This specification governs the performance of the following LND Nickel-Cadmium Cylindrical cell.

Model: 4000D-HT

Cell Size: D ( $\phi 32.1^{\pm 0.2} \times 59.2^{\pm 0.5}$ )

All data involves voltage and weight to stack-up battery are equal to the value of unit cell time the number of unit cell which consisted in the stack-up batteries.

Example: Stack-up battery consisting three unit cells.

Nominal voltage of unit cell=1.2V

Nominal voltage of stack-up batteries=1.2V  $\times$  3=3.6V

## 2、RATINGS

Description	Unit	Specification	Conditions
Nominal Voltage	V/Cell	1.2	
Nominal Capacity	mAh	4000	Standard Charge/Discharge
Standard Charge	mA	400(0.1C)	T <sub>1</sub> =0~55°C (see Note1)
	Hour	14~16	
quick Charge	mA	800(0.2C)	- $\Delta V$ =0-5mV/Cell or Timer Cutoff=120 % nominal capacity or Temp. Cut-off=55°C. T <sub>1</sub> =10~55°C
	hour	6.0approx. (see Note 2)	
Trickle Charge	mA	(0.03C)~(0.05C)	T <sub>1</sub> = 0~55°C
Standard discharge	mA	800(0.2C)	T <sub>1</sub> = -20~55°C Humidity: Max.85%
Discharge Cut-off Voltage	V/Cell	1.0	
Storage Temperature	°C	-20~55	Discharged state、 Humidity、 Max.85%
Typical Weight	Gram	115	

# LND

Document Title: Product Specification of High Temperature Ni-Cd 4000D-HT Cell and Stack up Batteries

## 3、PERFORMANCE

Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

Ambient Temperature,  $T_1$ :  $20 \pm 5^\circ\text{C}$

Relative Humidity:  $65 \pm 20\%$

Notes: Standard Charge/Discharge Conditions:

Charge:  $400\text{mA}(0.1\text{C}) \times 14$  hours

Discharge:  $800\text{mA}(0.2\text{C})$  to  $1.0\text{V}/\text{Cell}$

Test	Unit	Specification	Conditions	Remarks
Capacity	mAh	$\geq 4000$	Standard Charge / Discharge	up to 3 cycles are allowed
Open Circuit Voltage(OCV)	V/ Cell	$\geq 1.25$	Within 1 hour after standard Charge	
Internal Impedance	$\text{m}\Omega$ / Cell	$\leq 15$	Upon fully charge(1 K Hz)	
High Rate Discharge(1200mA)	minute	$\geq 180$	Standard Charge, 1 hour rest Before discharge by 1200mA to 1.0V/cell	up to 3 cycles are allowed
Charge Retention	mAh	$\geq 70\%$	Standard Charge, Storage: 28 days, Standard Discharge	
IEC Cycle Life	Cycle	$\geq 300$	IEC61951-1(2003)7.4.1.1	(see Note 3)
Leakage		No leakage nor deformation	Fully charged at 800mA(0.2C) for 6 hrs Stand for 14 days	
Vibration Resistance		Change of voltage should be under 0.02V/ Cell, Change of impedance should be under $5 \text{ m}\Omega$ / Cell	Charge the cell 0.1C 14hrs,then leave for 24hrs,check Cell before/after vibration, Amplitude 1.5mm Vibration 3000 CPM Any direction for 60mins.	
Impact Resistance		Change of voltage should be under 0.02V/ Cell Change of impedance should be under $5 \text{ m}\Omega$ / Cell	Charge the cell 0.1C 14hrs Then leave for 24hrs,check bat-before/after dropped, Height 50cm Wooden board(thickness 30mm) Direction not specified, 3 times.	

# LND

Document Title: Product Specification of High Temperature Ni-Cd 4000D-HT Cell and Stack up Batteries

## CONFIGURATION DIMENSIONS AND MARKINGS

Please refer to the attached drawing.

### 4、EXTERNAL APPEARANCE

The cell/battery shall be free from cracks, scars, breakage, rust, discoloration, leakage nor deformation.

### 5、WARRANTY

One year limited warranty against workmanship and material defects.

### 6、CAUTION

- (1)Reverse charging is not acceptable.
- (2)Charge before use. The cells/batteries are delivered in an uncharged state.
- (3)Do not charge/discharge with more than our specified current.
- (4)Do not short circuit the cell/battery Permanent damage to the cell/battery may result.
- (5)Do not incinerate or mutilate the cell/battery.
- (6)Do not solder directly to the cell/battery.
- (7)the life expectancy may be reduced if the cell/battery is subjected adverse conditions like: extreme temperature, deep cycling, excessive overcharge/ over-discharge.
- (8)store the cell/battery uncharged in a cool dry place. Always discharge batteries before bulk storage or shipment.

### Notes:

1.  $T_1$ : Ambient Temperature.
2. Approximate charge time from discharged state, for reference only.
3. IEC61951-1(2003)7.4.1.1Cycle Life:

Cycle No.	Charge	Rest	Discharge
1	$0.1C \times 16h$	None	$0.25C \times 2h20min$
2-48	$0.25C \times 3h10min$	None	$0.25 \times 2h20min$
49	$0.25C \times 3h10min$	None	0.25C to 1.0V/ cell
50	$0.1C \times 16h$	1-4h	0.2C to 1.0V/ cell
Cycles 1 to so shall be repeated until the discharge duration on any 50th Cycle becomes less than 3 h.			

# LND

文件名: Cd-Ni 高温 D4000 单体或组合电池产品说明书

## 1、范围

本说明书包括了下述的 LND 牌 Ni-Cd 圆柱电池单体及组合的全部性能指标。

电池标称: 4000D-HT

型 号: D 平( $\phi 32.1^{+0.2} \times 59.2^{+0.5}$ )

组合电池的电压、重量等数据, 近似等于单体电池数与对应值之乘积。

例如: 组合电池包括三个单体电池

单体电池的额定电压=1.2V

则电池组的额定电压=1.2V $\times$ 3=3.6V

## 2、额定性能

项目	单价	指标	条件
额定电压	V/只	1.2	单体及组合电池
额定容量	mAh	4000	标准充放
标准充电	mA	400(0.1C)	T <sub>1</sub> = 0~55°C(见 note 1)
	hour	14~16	
快充	mA	800(0.2C)	充电终止条件: $-\Delta V=0\sim 5\text{mV/只}$ 或 充电至 120% 额定容量或电池升温至 55°C T <sub>1</sub> = 10~55°C
	hour	6approx (see Note 2)	
涓充	mA	(0.03C)~(0.05C)	T <sub>1</sub> = 0~55°C
标准放电	mA	800(0.2C)	T <sub>1</sub> = -20~55°C 湿度: 最大 85%
放电截止电压	V/只	1.0	
贮存温度	°C	-20~55	放电状态下, 最高环境湿度 85%
单体电池重量	克	115	

## LND

文件名: Cd-Ni 高温 D4000 单体或组合电池产品说明书

### 3、电池性能

除非另有说明, 测试须在发货后一个月内在下述条件下进行:

环境温度  $T_1$ :  $20 \pm 5^\circ\text{C}$                       相对湿度:  $65 \pm 20\%$

注意: 标准充放条件: 充电: 400mA(0.1C) 充 14 小时

放电: 800mA(0.2C) 至 1.0V/只

测试项目	单位	指标	其它条件	备注
容量	mAh	$\geq 4000$	标准充放	允许最多三次充放
开路电压	V	$\geq 1.25$	在标准充电后 1 小时内测量	
内阻	m $\Omega$	$\leq 15$	充满电后(1KHZ 的交流频率)	
1200mA 放电时间	minute	$\geq 180$	标准充电后搁置 1 小时, 1200mA 放电至 1.0V	允许最多三次充放
荷电保持能力	mAh	$\geq 70\%$	标准充电后存放 28 天, 标准制度放电	
IEC 循环寿命	Cycle	$\geq 300$	IEC61951-1(2003)7.4.1.1	(参见 Note 3)
泄漏		无漏液或变形	0.2C 充电 6.0 小时, 存放 14 天后检查	
抗振动		电压变化 $< 0.02\text{V}/\text{只}$ , 内阻变化 $< 5\text{ m}\Omega/\text{只}$	将电池用 0.1C 电流充 14 小时, 开路 24 小时, 检查振动前后电池状况, 振动幅度 1.5mm, 振动 3000 次, 任意方向振动 60 分钟	
抗撞击		电压变化 $< 0.02\text{V}/\text{只}$ , 内阻变化 $< 5\text{ m}\Omega/\text{只}$	将电池用 0.1C 电流充 14 小时, 开路 24 小时, 检查掉落前后电池状况, 落体高度 50cm, 30mm 厚的木板, 3 次	

# LND

文件名: Cd-Ni 高温 D4000 单体或组合电池产品说明书

## 4、电池结构、尺寸、包装物

参见附图

## 5、外观

无裂缝、疤痕、破裂、锈蚀、脏污、漏液、变形

## 6、使用注意事项

- (1) 勿将电池反极充电。
- (2) 初次使用前先充电。
- (3) 避免以高于指定的电流充放电。
- (4) 防止电池短路，以免造成可能的损坏。
- (5) 勿拆解或焚烧电池。
- (6) 勿在电池上直接焊接。
- (7) 如极端高温、深度循环、过量的过充、过放电，电池的使用寿命可能会下降。
- (8) 电池应贮放干爽阴凉处；组合电池或装定前应将电池放电。

## Notes:

- (1)  $T_1$ : 环境温度
- (2) 以放电态为基准的大致充电时间仅供参考。
- (3) IEC61951-1(2003)第 7.4.1.1 条: 循环寿命

循环周次	充电	搁置	放电
1	$0.1C \times 16h$	无	$0.25C \times 2h20min$
2-48	$0.25C \times 3h10min$	无	$0.25 \times 2h20min$
49	$0.25C \times 3h10min$	无	0.25C to 1.0V/只
50	$0.1C \times 16h$	1-4h	0.2C to 1.0V/只

循环至任一第 50 次放电时间不足 3 小时为止。