

# Technical Product Specification

Cat : Nickel Cadmium Rechargeable  
Model no. : CD2500C-NF  
Issue date : 16-Oct-09  
Revision : C

## (1) Scope

This specification is applicable to Nickel Cadmium cylindrical rechargeable battery. All data involves voltage and weight of stack-up battery pack are equal to the value of unit cell times the number of cells in the battery pack.

Example:

Stack-up battery pack consist of 3 cells

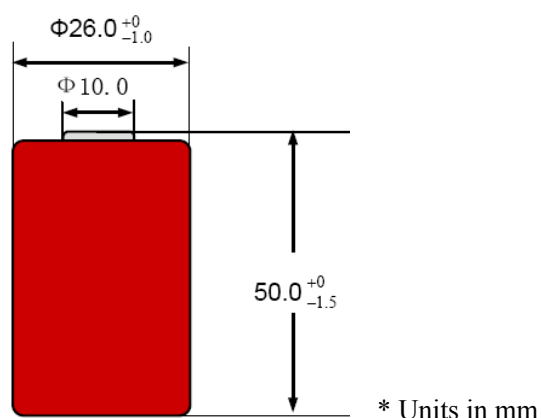
Nominal voltage of one cell = 1.2V

Nominal voltage of stack up battery pack = 3.6V (3 x 1.2V)

## (2) General information

Characteristics		Specification	Remark
Nominal Capacity		2500mAh	0.1C charge for 16 hrs 0.2C discharge till 1.0V
Nominal Voltage		1.2V	
Charge current	Standard	250mA (0.1C)	
	Fast	1250mA (0.5C)	Charge controlled by: -dV: 20mV/cell dT/dt: 1°C/min
	Trickle	(0.03C) to (0.05C)	
Charge time	Standard	16 hrs	
	Fast	2.6 hrs	
Standard discharge current		500mA	
Cut-off voltage		1.0V / cell	
Maximum discharge current		7500mA	
Operating temperature	Standard	0 to 45°C	
	Fast	10 to 40°C	
	Trickle	0 to 45°C	
	Discharge	-20 to 60°C	
Storage temperature	< 1 year	-20 to 35°C	
	< 3 months	-20 to 45°C	
Dimension		Diameter 26.0 <sup>+0/-1.0</sup> mm Height 50.0 <sup>+0/-1.5</sup> mm	
Weight (for reference only)		~63 grams	

### (3) Dimension



### (4) Electrical Performance

Unless otherwise specified, tests should be conducted within one month of delivery under conditions of ambient temperature  $20\pm 5^{\circ}\text{C}$  and relative humidity:  $65\pm 20\%$

Test Item	Test Conditions	Requirements
(1) Standard Charge	Charge for 16 hours at constant current of 0.1C after pre-discharge at the constant current of 0.2C until cut-off voltage of 1.0V	N/A
(2) Open-circuit Voltage	Voltage between terminals of the charged battery specified in item (1) is measured after rest for 1 hour	$\geq 1.25\text{V}$
(3) Initial Impedance (for reference only)	The initial impedance is measured at 1KHz within one hour after standard charge	Average $15\text{m}\Omega$
(4) Capacity	Capacity of the charged battery specified in item (1) is measured by discharge the battery at 0.2C until cut-off voltage of 1.0V after rest for 15 minutes. Up to 5 cycles is allowed.	$\geq 2500\text{mAh}$
(5) High rate capacity	High rate capacity is measured with a discharge current of 0.5C to a voltage of 1.0V after standard charge	$\geq 2125\text{mAh}$
(6) Charge retention	Standard charge as item# 1, store at room temperature for 28 days, then discharge at 0.2C to 1.0V	$\geq 1625\text{mAh}$
(7) Discharge capacity at $-18^{\circ}\text{C}$	After standard charge as item (1), the cell is stored in an ambient temperature of $-18^{\circ}\text{C}$ for not less than 16 hours and not more than	$\geq 1500\text{mAh}$

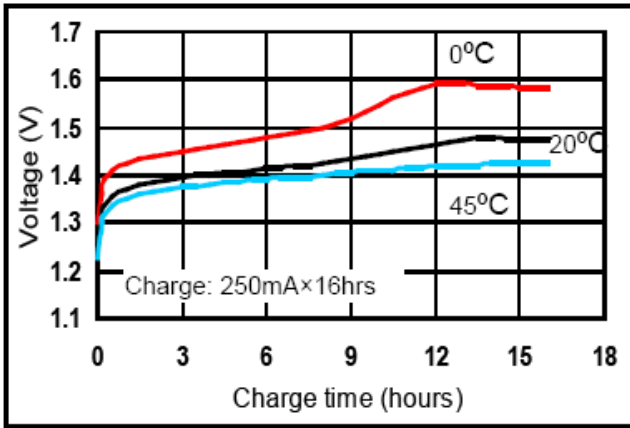
	24 hours. Battery is then normalized at room temperature for 4 hours. The capacity is measured with a discharge current of 0.2C and a discharge cut-off voltage of 1.0V	
(8) Leakage test	After standard charge as item#1, then store for 14 days at room temperature	No leakage or deformation
(9) IEC cycle life	According to IEC61951-1 (2003-04), see note 1	≥ 500 cycles
(10) Vibration test	This means endurance of the cell against vibrations. Conditions: Frequency: 10 – 500 Hz Vibration amplitude: 0.35mm peak or maximum 50m/s <sup>2</sup> Axes of vibration: 3 mutually perpendicular axes Sweep cycles: 5 cycles Sweep speed: 1 octave per minute	No visible leakage, no venting or functional loss
(11) Drop test	This means the endurance of the cell against drop. Conditions: Height: 1m Direction: 1 drop along each direction of the 3 mutually perpendicular axes Surface: Wooden board, 5 cm thick	No visible leakage, no venting or functional loss
(12) Safety Device Operation	The cell shall be forced discharged at an ambient temperature of 20°C ± 5°C at a constant current of 0.2C to a final voltage of 0V. The current shall then be increased to 1C and maintained in the same direction for 60 minutes.	No explosion, but leakage or deformation is allowed
(13) Overcharge	The overcharge capacity is the discharge capacity of the cell measured with a discharge current of 0.2C within one hour after charging for 28 days at a current of 0.1C	No leakage and capacity more than 2500mAh

\* Note 1: IEC61951-1 (2003-04) Cycle life

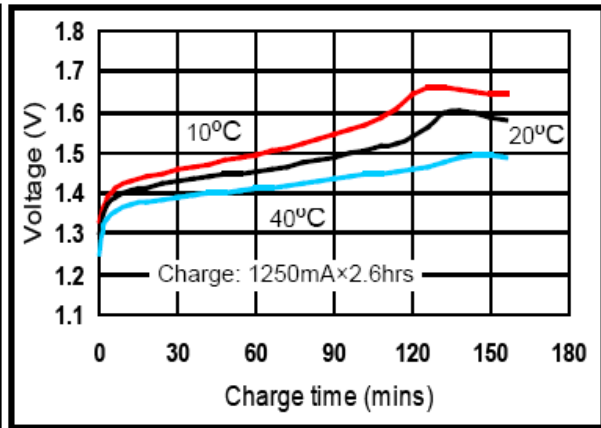
Cycle no	Charge	Rest	Discharge
1	0.1C X 16h	None	0.25C X 2h20min
2-48	0.25C X 3h10min	None	0.25C X 2h20min
49	0.25C X 3h10min	None	0.25C to 1.0V / cell
50	0.1C x 16h	1-4h	0.2C to 1.0V / cell
Cycles 1 to 50 shall be repeated until the discharge duration of any 50 <sup>th</sup> cycles becomes less than 3hrs			

## (5) Typical characteristic curves

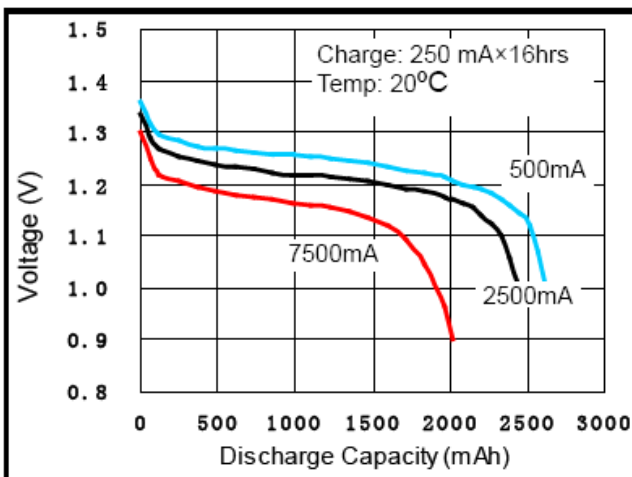
### ● Standard charge characteristics



### ● Fast charge characteristics



### ● Discharge characteristics



## (6) Caution

- ⚠ Do not reverse charge
- ⚠ Charge before use. The cells/batteries are delivered in an uncharged state
- ⚠ Do not charge/discharge with more than our specified current
- ⚠ Do not short circuit the cell/battery. Permanent damage to the cell/battery may be resulted
- ⚠ Do not incinerate or mutilate the cell/battery
- ⚠ Do not solder directly to the cell/battery
- ⚠ The life expectancy may be reduced if the cell/battery is subjected adverse conditions like: extreme temperature, deep cycling, excessive overcharge/ over-discharge
- ⚠ Store the cell/battery uncharged in a cool dry place. Always discharge batteries before bulk storage or shipment.