



Specification Approval Sheet

Name: **Tenergy NiMH Rechargeable Battery**

Model: **10203-0**

SPECS: **1.2V 5000mAh C Size (Flat Top)**

Approved By	Checkup	Make

Customer Confirmation	Signature	Date
	Company Name:	
	Stamp:	

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Modification Record Table

NO:	Date	Modification description	Modification Manager



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1、 APPLICATION

This specification governs the performance of the following Nickel-metal hydride Cylindrical cell and its stack-up battery

Model : Ni-MH 49C5000mAh 1.2V

Cell Size: Flat: C($\phi 26^{+0}_{-0.7} \times 49.0^{+0}_{1.0}$) (see Note1) -

2、 RATINGS

Description	Unit	Specification	Conditions
Nominal Voltage	V/cell	1.2	---
Nominal Capacity	mAh	5000	Standard Charge/Discharge
Minimum Capacity	mAh	4500	Standard Charge/Discharge
Standard Charge	mA	500(0.1C)	Ambient Temperature: Ta= 20±5°C (see Note 3)
	Hour	14-16	
Quick Charge	mA	1000(0.2C)	dT/dt=0.8 -1.0°C/minute - $\Delta V=10mV$ 45°C < Temp cut off ≤50°C Ta =0-40°C (see Note 4)
	hour	6.5	
Fast Charge	mA	2500(0.5C)	
	hour	2.4	
Trickle Charge		(0.03C)~(0.05C)	T ₁ = 0~40°C
Standard discharge	mA	1000(0.2C) ≥300minute	Ambient Temperature: Ta= 20±5°C (see Note 5) Humidity: : 50±15%
	mA	5000(1.0C) ≥54minute	
Discharge Cut-off Voltage	V/cell	1.0	---
Storage Temperature	°C	-20~60°C/Within 6 months	charged state of 30%、 Humidity、 Max.85% (see Note 2)
Temperature range for operation	°C	0~40°C/Standard Charge	Humidity Max.85%
		10~40°C/ Quick Charge	
		0~40°C Trickle Charge	
		-10~50°C Standard discharge	
Approx Typical Weight	g/ cell	Approx 88g	Unit cell



3、PERFORMANCE

Unless otherwise stated, tests should be done within one month of delivery under the following conditions: Ambient Temperature, T: 20±5℃; Relative Humidity: 50±15%

Test item	Unit	Specification	Other Condition	Remarks
Least Capacity (0.2C)	mAh	5000	Standard Charge Discharge	up to 3 cycles are allowed
High Rate Discharge(0.5C)	minute	≥118	Standard Charge, 1 hour rest Before Discharge by 2500mA (0.5C) to 1.0 V /cell	up to 3 cycles are allowed
Maximum continuous current	mA	≤15000(3C)	Standard Charge, 1 hour rest before discharge by 3C to 0.9 V/	≥15 (minute)
Internal Impedance	mΩ/cell	≤15	Upon fully charge(1KHz)	10-15mΩ
Overcharge		No leakage nor deformation	500mA(0.1C)Charge 2 days/500mA (0.1C)	---
Charge Retention	mAh	≥3500(75%)	Standard Charge Storage: 28 days, Standard Discharge	---
IEC Cycle Life	Cycle	500	IEC61951-2(2011) 7.4.1.1	(see Note 6)
Leakage Test		No leakage nor deformation	Standard Charge stand for 14 days	---
Vibration Resistance		Change of voltage should be under 0.02V/cell, Change of impedance should be under 3 mΩ/cell	Charge the cell 0.1C 16hrs, then begin the test 。 After the test , leave the cell for 0.5~2 hrs, then discharge the cell 0.2C to 1.0V Acceleration of peak value : 98m/S ² ; Pulse hours: 16ms; Speed Change:1.00m/s; Collision Time: 1000±10	Surroundings Temperature: T=20±5℃
Impact Resistance		Change of voltage should be under 0.02V/cell Change of impedance should be under 3 mΩ/cell	Charge the group 0.1C 14hrs Then leave for 24hrs, check battery-before/after dropped Height 50cm Wooden board (thickness 30 mm) Direction not specified, 3 times.	Surroundings Temperature: T=20±5℃



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Security Test	No break nor blast , but Allow leakage or deformation	discharge the group 0.2C to 0V , then advance current to 1C . discharge the group 1C 30 minutes	Surroundings Temperature: T=20±5°C
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4、 CONFIGURATION,DIMENSIONS AND MARKINGS

Please refer to the attached drawing

5、 EXTERNAL APPEARANCE

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

6、 CAUTION

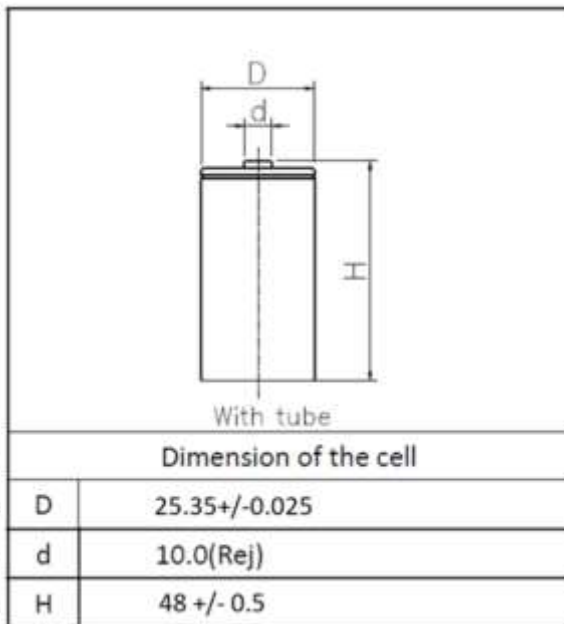
- (1)Reverse charging is not acceptable
- (2)Discharge to 1.0V/cell by 0.2C before use ,then charge
- (3)Do not charge/discharge with more than our specified current
- (4)Do not short circuit the cell/battery Permanent damage to the cell/battery may result
- (5)Do not incinerate or mutilate the cell/battery
- (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

7. Notes:

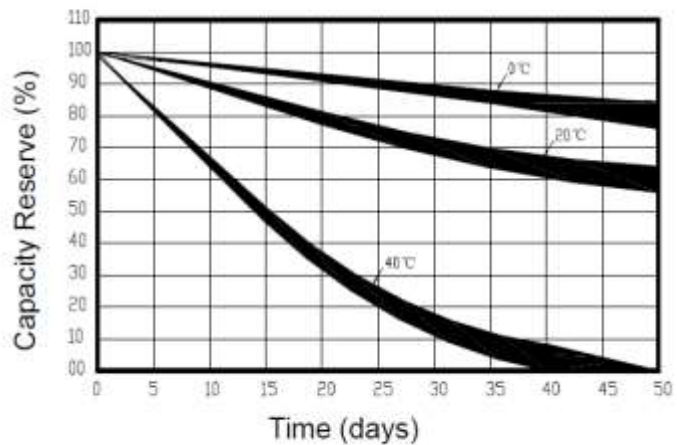
- (1)Ta: Ambient Temperature
- (2)Approximate charge time from discharged state, for reference only.
- (3)If the batteries or battery packs are subjected to storage for such a long term as more than 3 months ,it is recommended to recharge the batteries or battery packs periodically ,e.g. every 3 months, or before the open circuit voltage (OCV) of the battery pack comes down to 1.1 volts in order to obtain reasonably good capacity recovery and prevent battery performance degradation
- (4) IEC61951-2(2011)7.4.1.1 Cycle Life:

Cycle No.	Charge	Rest	Discharge
1	0.1C×14h	No	0.25C×2h20min
2-48	0.25C×3h10min	No	0.25C×2h20min
49	0.25C×3h10min	No	0.25C to 1.0V/cell
50	0.1C×14h	1-4h	0.2C to 1.0V/cell
Cycles 1 to 50 shall be repeated until the discharge duration on any 50th Cycle becomes less than 3 h			

8. THE ATTACHED DRAWING

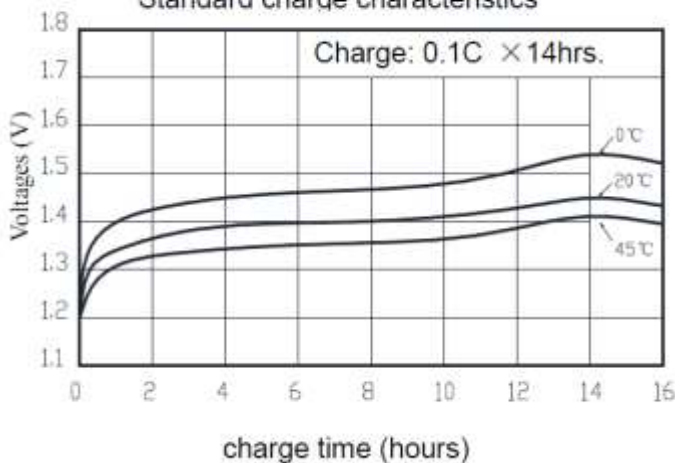


Ni-MH Charge retention curves of Ni-MH cylindrical cell At various storage Temperature.

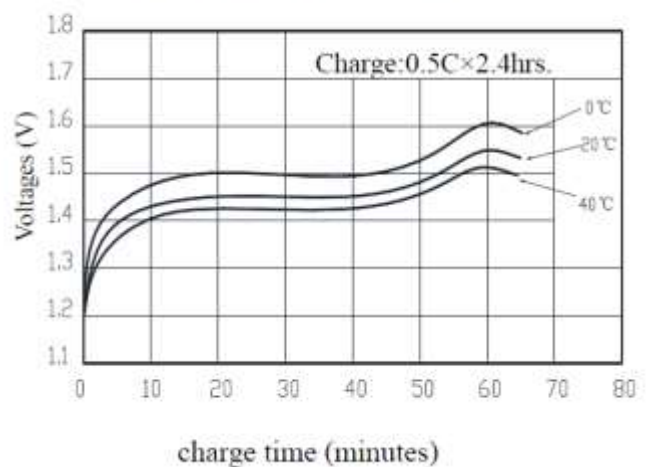


Typical characteristics

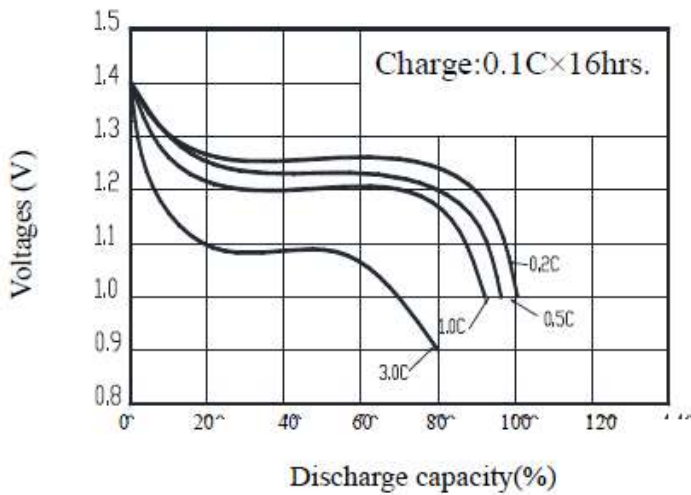
Standard charge characteristics



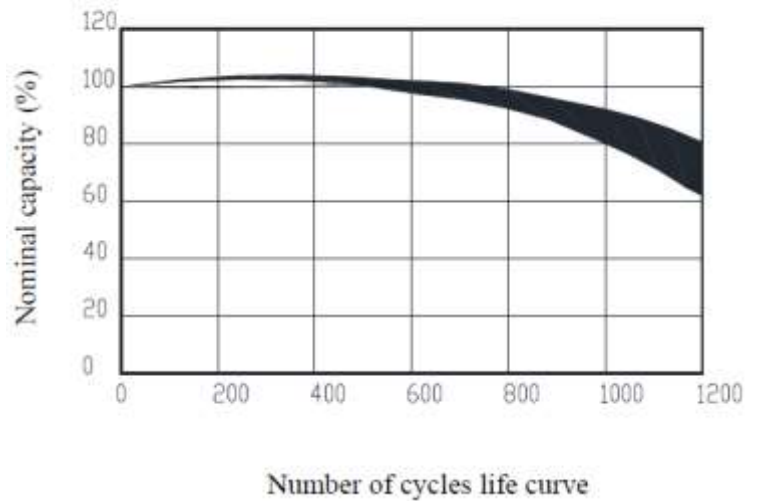
Rapid charge characteristics



Discharge characteristics



Cycle life characteristics



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