

SPECIFICATION

For sealed Nickel Metal Hydride cylindrical Cells

Cell Type: H-28A1400

Prepared by:

Approved by:

Title:

Date:



Intellect Telecommunication Electronics Ltd.

1. Preface

This product specification covers the requirements for the following rechargeable sealed Nickel Metal Hydride cylindrical cell type manufactured and delivered by Intellect Telecommunication Electronics Ltd.

H-28A1400 High Power Type Cell

2. Description and Model

- 2.1 Description Rechargeable sealed Nickel Metal Hydride cylindrical High Power Type cell
- 2.2 Model H-28A1400

3. Cell Dimensions (including shrink sleeve)

Refer to the attached drawing.

Diameter	17.0– 1.0mm、
Height	28.5-1.0mm
Approximate Weight	25g

4. Ratings

Nominal Voltage		1.2V	
Discharge Capacity (after 2000mA (- ΔV=20mV) charging)	0.2C(280mA)discharge to 1.0V	1440 mAh (duration 310min)	
	1C(1400mA)discharge to 0.97V	1400 mAh (duration 60min.)	
	3C(4200mA)discharge to 0.9V	1400 mAh (duration 20min.)	
	10C(14A) discharge to 0.90V	1400 mAh (duration 6.0min.)	
	20C(28 A) discharge to 0.80V	1400 mAh (duration 3.0min)	
Internal Impedance (at 1kHz, fully charged, RT)		6.0 mOhm	
Charge	Standard	0.1C (140mA) for 16 hrs, (Peak Voltage reference : 1.46V) 0.2C (280mA) for 8 hrs, (Peak Voltage reference : 1.48V)	
	Fast	Up to 1400mA for 1.2hrs,-delta V controlled : 5mV/cell, or dT/dt controlled : 1°C per min.(Peak Voltage reference : 1.50V) Up to 2000mA for 0.6hr,-delta V controlled : 20 mV/cell, or dT/dt controlled : 1°C per min.(Peak Voltage reference : 1.52V)	
	Trickle	0.03C (42mA) to 0.05C (70mA)	
Life Expectancy		500 cycles	
Operating Temperature	Charge	Standard	0°C to 45°C
		Fast	10°C to 45°C
	Discharge		-10°C to 65°C
	Storage	< 1 year	-20°C to 35°C
		< 3 months	-20°C to 45°C

5. Appearance

The cell shall be free from :
 swelling of cell bottom
 Leakage (liquid electrolyte, or crystal at vent)
 Damages (dents, defect shrinking tubes)
 Corrosion & contamination of welding areas

6. Performance

Unless otherwise stated, tests should be conducted under the following conditions:

Time frame Within one month of delivery

Ambient temperature 20 ± 5°C

Relative Humidity 65 ± 20%

6.1) Standard Charge

Discharge the cell to 1.0V at 0.2C (280mA), then charge at 0.1C (140mA) for 16hrs, or 0.2C (280mA) for 8 hrs.

6.2) Standard Discharge Capacity

Measure the cell with a discharging current of 0.2C within one hour after the standard charge. Up to 3 cycles are allowed in order to reach the nominal capacity.

6.3) High rate capacity

Measure the cell with a discharging current of 1C to a Voltage of 0.97V after standard charge.

Discharge Rate	Discharge Current (mA)	Final Voltage (V)	Minimum Capacity (mAh)	Minimum Discharge Duration (min.)
0.2C	280	1.00	1400	300
1C	1400	0.97	1350	58
3C	4200	0.95	1330	19
10C	14000	0.90	1280	5.5
20C	28000	0.80	1260	2.7

6.4) Open circuit Voltage

To be above 1.25V within 1 to 4 hours after standard charge

6.5) Initial Impedance

Measure at 20°C and 1KHz within one hour after standard charge

Initial internal impedance ≤8.0mOhm



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6.6) Charge retention

After standard charge, and a storage time 28 days at ambient temperature, the capacity is measured using standard discharge.

Capacity > 910mAh (duration : > 195 minutes)

6.7) IEC cycle life

According IEC285 (1993) 4.4.1, cycle life of 500 cycles is expected.

6.8) Leakage

After charging at 1C, and storage for 14 days at room temperature, no leakage nor deformation.

6.9) Overcharging

After charging at 0.1C (140mA) for 48 hrs, no leakage or deformation.
Then, discharge at 0.2C (280mA) to 1.0V, capacity > 1400mAh (duration 300 min.).

6.10) Abusive Charge

Test MUST be carried out in a protective chamber, with extreme caution!

Charge at 1C (1400mA) for 1 hrs.
Leakage and deformation may occur, however, no explosion is allowed.

6.11) Over-Discharge

Test MUST be carried out in protective chamber, with extreme caution!

The cell is forced to be discharged at 0.2C (280mA) to 0.2V, then at 1C (1400mA) for at least 1 hr.
Leakage and deformation may occur, however, no explosion is allowed.

6.12) Short Circuit

Test MUST be carried out in protective chamber, with extreme caution!

After standard charge, the cell is short circuited for one hour with a copper wire with maximum resistance load of 0.1 Ohm
Leakage and deformation may occur, however, no explosion is allowed.

6.14) Reverse charging

Reverse charging is not allowed

6.15) Vibration Test

This means the endurance of the cell against vibrations

Conditions:	Amplitude:	4.0mm
	Vibration:	1000CPM (16.7 Hz)
	Time:	60min.

Criteria: No major mechanical damage nor functional loss.
Minor OCT changes (<20mV) are acceptable.

6.16) Drop Test

This means the endurance of the cell against drop

Condition:	Height:	1m
	Direction:	Not specified
	Surface:	Oak board, 5cm thick
	Number of test:	3 times

Criteria: No major mechanical damage nor functional loss.
Minor OCT changes (<20mV) are acceptable.

7. Safety Instructions

7.1) Warnings :

Please follow the instructions to avoid electrolyte leakage, heat generation or explosion of the cells. The alkaline electrolyte of the cells may harmful to skin and eyes.

- Do not short-circuit cells.
- Do not dispose the cell of in fire.
- Do not solder cells directly.
- Do not disassemble cells.
- Do not deform cells by applying pressure.
- Do not dip cells into water.
- Do not connect cells in reverse polarities.
- Do not charge and discharge cells at high current.
- Do not mix cells of different types and/or different models (dry cells, alkaline cells, or Nickel-Cadmium cells).
- Do not use old and new cells together.
- Do not install cells in a completely sealed casing or compartment.

7.2) Precautions :

- Keep cells out of reach of children to avoid any accident.
- Charge the cell before usage. Be sure to charge properly.
- Make use of the specification in an appropriate and effective manner.

8. Battery Handling

8.1) Transportation

During transportation, the battery should be kept at refresh condition, being charged halfway.

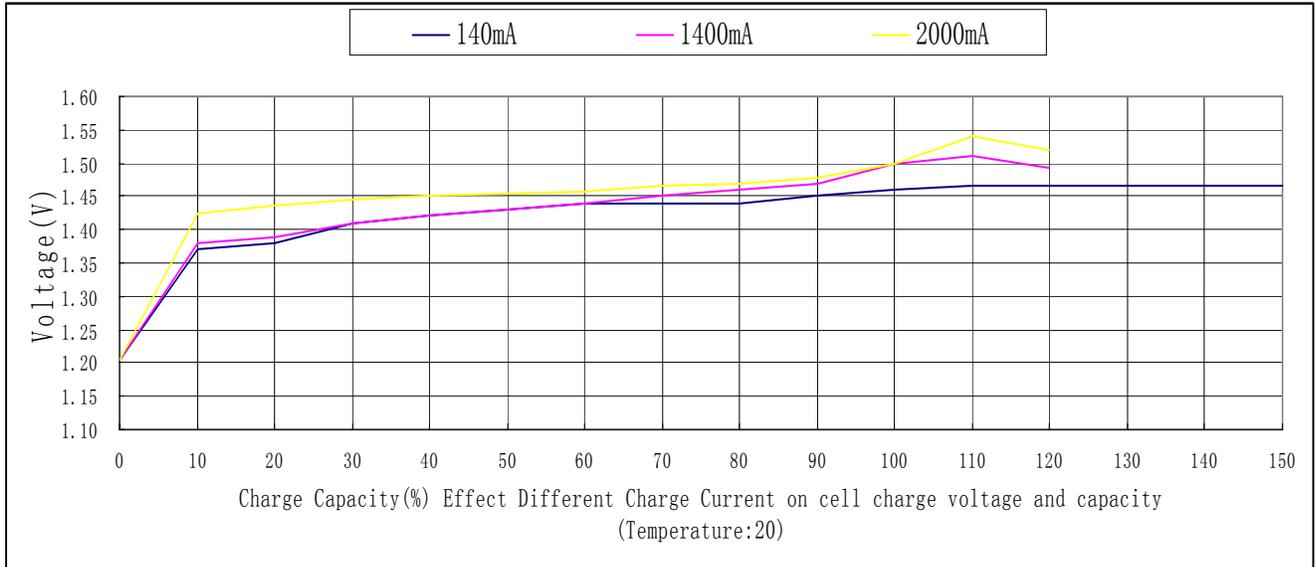
8.2) Final Voltage

- Our suggestion for each cell's final voltage : 1.0 to 1.1V
- If final voltage higher than 1.1V, the battery does not fully discharge, causing it not delivering full capacity in subsequent cycle.
- If final voltage lower than 1.0V, the battery will be over-discharged or becoming anti-fresh.

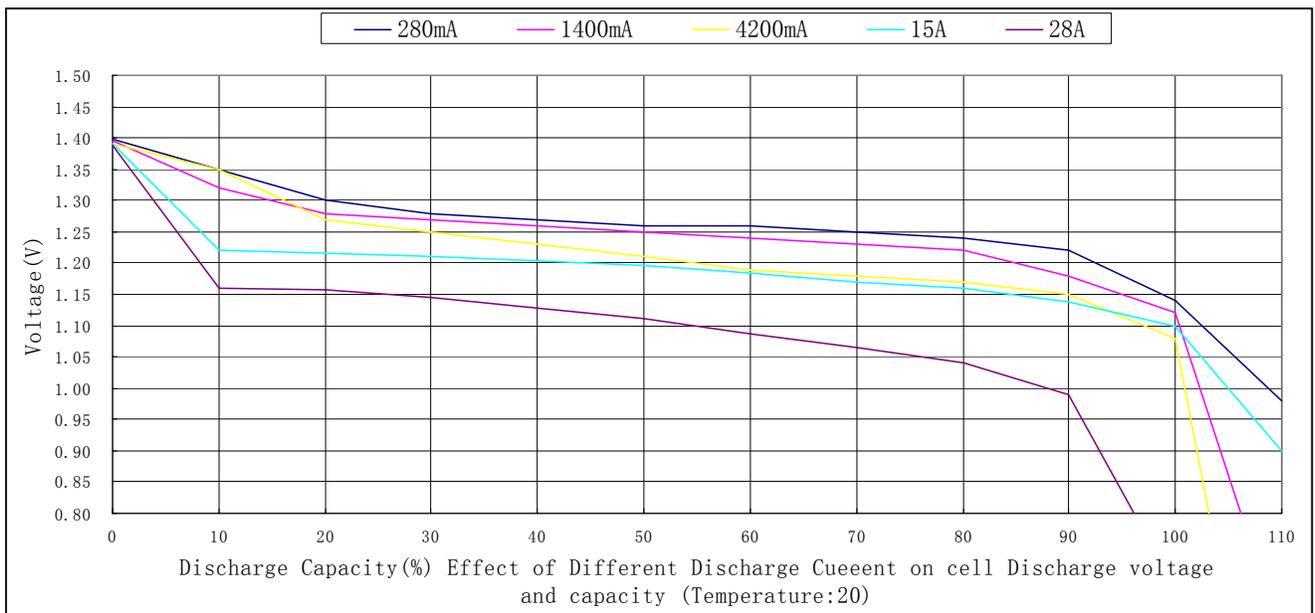
9. Warranty

As long as the cell is treated in accordance with this product specification, 6-month limited warranty against workmanship and material defects is given.

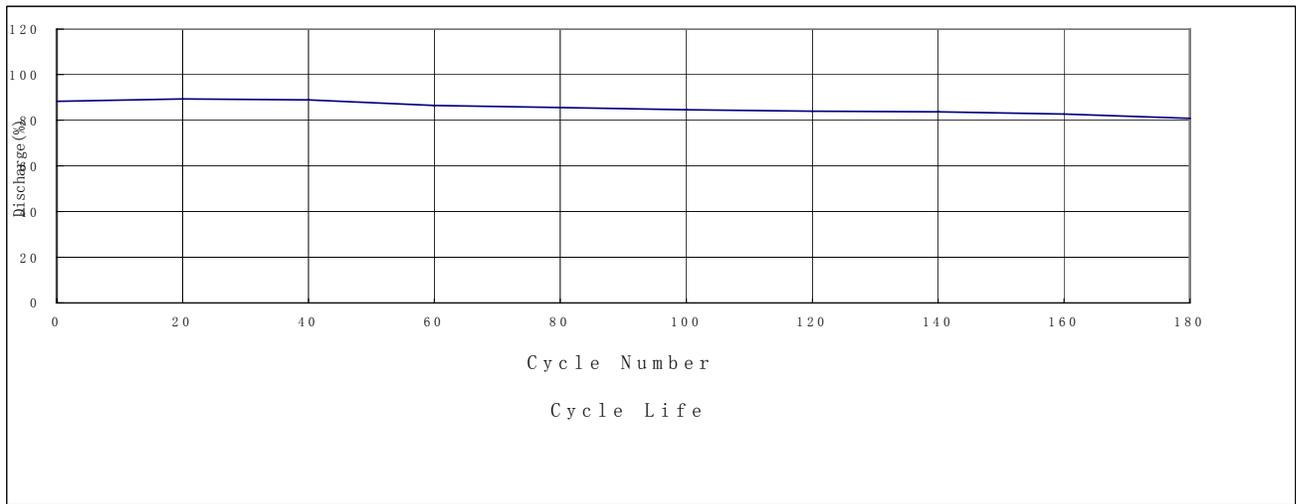
Electrical Characteristic Curve



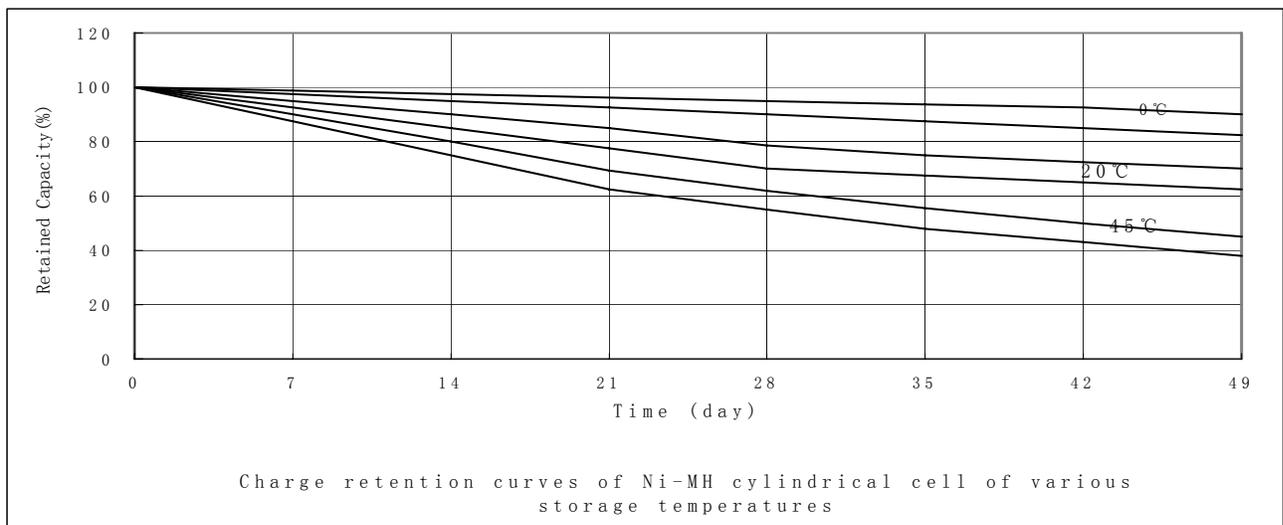
Electrical Characteristic Curves

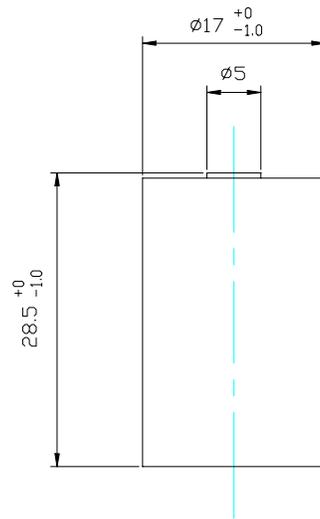


Electrical Characteristic Curves



Electrical Characteristic Curves





Version		Revised date		Revision details		Title		Customer Ref		Qty	Weight	Scale
A01						Computer File No		H-28A-1400				
Date		Total:		INTELLECT TELECOMMUNICATION ELECTRONICS LTD								
Drawn by		Page No:										
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